

RECYCLING IN MONTGOMERY COUNTY PUBLIC SCHOOLS



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Aron Trombka
Richard Romer

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THE ASSIGNMENT

At the request of the County Council, the Office of Legislative Oversight conducted a study on recycling in Montgomery County Public Schools (MCPS). This report: describes MCPS recycling practices; provides information about school system waste generation; compares recycling rates among schools; identifies factors associated with high recycling rates; and identifies opportunities for increasing MCPS' recycling.

RECYCLING RATE AND WASTE COMPOSITION

Recycling is the process of collecting materials that otherwise would be disposed as trash for reprocessing into new products. The recycling rate is calculated by dividing the amount of a material recycled by the amount of a material recycled plus the amount of the material disposed as trash.

$$\text{Recycling Rate} = \frac{\text{Recycling Tons}}{\text{Recycling Tons} + \text{Trash Tons}}$$

MCPS captures significant amounts of paper and commingled containers (bottles and cans) for recycling. Based on data from the 2006-2007 school year, MCPS has a recycling rate of 27%. The remaining 73% of MCPS' waste stream includes food waste, non-recyclable paper, and non-recyclable plastics, as well as recyclable paper and containers that were disposed as trash.

MCPS recycles 57% of recyclable paper and 42% of commingled containers. However, MCPS also disposes significant quantities of recyclables in the trash. MCPS schools trash about 2,000 tons of recyclable paper and 500 tons of commingled containers in a year.

Recycling Rates by Material, 2006-2007

Material Type	Recycling Rate
All Materials	27%
Recyclable Paper	57%
Commingled Containers	42%
Yard Trim	57%
Scrap Metal	50%

OVERVIEW OF MCPS' RECYCLING PROGRAM

MCPS has put in place the basic infrastructure for school recycling, which means that students and staff have the opportunity to recycle paper and commingled containers. All schools have paper recycling bins in classrooms, copier rooms, offices, libraries, and computer labs. Schools also provide commingled container recycling bins in the lunch room and rooms where staff members eat. School loading docks have large containers for recyclables that are emptied regularly by a contract waste hauling company. In addition, MCPS requires each school to designate a Recycling Coordinator and a Recycling Team.

While all schools have a basic recycling infrastructure, OLO observed variations in the implementation of recycling programs. For example, individual schools have adopted different approaches to the:

- Collection of recyclables from classrooms;
- Location and number of recycling bins; and
- Promotion of the recycling program.

In addition, the composition of each school's Recycling Team varies. In some schools, the Recycling Team consists of only the Building Service Manager; in others, it includes some combination of administrators, teachers, parents, and students.

School Characteristics and the Recycling Rate

VARIATIONS IN THE RECYCLING RATE

MCPS elementary schools have achieved a median recycling rate of 28%. For middle schools and high schools, the comparable rates are 25% and 22% respectively. Wide variations in recycling rates exist within each school level. Recycling rates for:

- Elementary schools range from 19% to 61%;
- Middle schools range from 20% to 38%; and
- High schools range from 18% to 30%.

Paper recycling is the dominant contributor to school recycling. Paper accounts for about three-quarters (measured by weight) of all school recycling. Elementary schools recycle 31 times more paper than commingled containers. Although high schools have a relatively low paper recycling rate, paper still dominates MCPS' recycling, contributing nine times more weight than commingled containers.

SCHOOL CHARACTERISTICS AND RECYCLING

An inverse relationship exists between MCPS recycling rates and school size (measured by enrollment and building size). In other words, smaller schools tend to have higher recycling rates while larger schools tend to have lower rates. This pattern is evident at all school levels, i.e., elementary, middle, and high school.

MCPS recycling data indicate no apparent relationship between recycling performance and various other quantifiable school characteristics, including: building age; the number of portable classrooms; the percent of students eligible for free and reduced meals; the percent of students with limited English proficiency; and the student mobility rate. Further, OLO also found no apparent relationship between the location of the school in the County and recycling performance.

SUCCESSFUL SCHOOL RECYCLING PRACTICES

In observing the recycling programs in MCPS schools, OLO identified the following practices in schools that demonstrate higher recycling rates:

1. High level of student involvement in support of the recycling program;
2. Collaboration in recycling activities among administrators, faculty, and building service workers;
3. Visible recycling promotion efforts;
4. Presence of recycling containers in high activity areas;
5. Contamination prevention (concerted efforts to prevent mixing recyclables and trash);
6. Co-location of trash bins and recycling bins;
7. Clearly marked and well-labeled recycling containers;
8. Frequent emptying of recycling and trash containers to prevent over-filling; and
9. Awareness of past recycling performance.

Each of the practices listed above occurred because a motivated person within the school went out of his/her way to assure that it happened. **The most significant factor in the success of a school recycling program is the presence of an outspoken recycling “champion.”** The champion is a faculty member, building service worker, student, administrator, or parent who:

- Serves as the “go to” person for recycling issues and questions;
- Finds new and effective ways to promote recycling;
- Notices and corrects problems with the recycling infrastructure, e.g., mislabeled, misplaced, or contaminated recycling bins; and
- Arranges for the frequent collection of recycling and trash.

OLO observed that these champions bring enthusiasm and dedication to the recycling program and influence the school's culture in favor of recycling.

Opportunities to Increase the Recycling Rate

ASSESSMENT OF CAFETERIA RECYCLING OPPORTUNITIES

OLO assessed four opportunities to increase recycling (or reduce waste) in MCPS cafeterias. The four assessments considered operational feasibility, availability of external recycling infrastructure, and costs.

Plastic Milk Bottles: MCPS serves school milk in non-recyclable coated paper cartons. Several school systems around the country have recently replaced paper milk cartons with recyclable plastic bottles. MCPS could use existing infrastructure to recycle plastic milk bottles. MCPS recently issued a new invitation to bid for the purchase of school milk that specifies a preference for recyclable plastic containers. This bidding process will determine the cost differential between purchasing milk in paper cartons versus plastic bottles.

Food Tray Recycling: MCPS serves school meals on disposable polystyrene trays. MCPS had recycled food trays for several years in the late 1980s and early 1990s, but was forced to abandon the program when all local vendors either went out of business or shifted to recycling other materials. A vendor who accepts trays from the Gwinnett County Public Schools (Georgia) currently is examining the feasibility of opening a facility in the Mid-Atlantic region. Further information is needed to determine whether the implementation costs of a tray recycling program would be offset by savings realized from the reduction in trash collection.

Reusable Food Trays: Some school systems serve meals on reusable food trays. This option is not feasible for MCPS as neither schools nor other facilities have sufficient space to accommodate tray washing equipment.

Food Waste Composting: While food waste composting, in theory, could reduce MCPS trash generation by around 20%, this option currently is not viable option as no food waste acceptance facilities exist in the region.

POTENTIAL TO INCREASE MCPS RECYCLING

Based on 2006-2007 school year data, 18 MCPS schools recycle paper and commingled containers consistent with an 80% capture rate. (The term "capture rate" means the percent of potentially recyclable materials actually set aside for recycling.) If the remaining 174 schools also achieve an 80% capture of these materials, the overall MCPS recycling rate would increase from 27% to 36%, with paper contributing three-quarters of this growth. Across all schools, this level of recycling achievement would divert an additional 1,400 tons of trash to the recycling stream.

Milk containers and food trays combined comprise about 1.5% of the MCPS waste stream. Although a switch to recyclable plastic milk bottles and the introduction of a food tray recycling program would reduce MCPS trash generation, achieving an 80% recycling rate of both milk bottles and food trays would only increase the overall MCPS recycling rate by about 1.2%.

Effect of Potential Increase in MCPS Recycling Rate by Material Type

Recyclable Material		Additional Tons Recycled*	Addition to Overall MCPS Recycling Rate
Currently Recycled	Recyclable Paper	1,050	6.4%
	Commingled Containers	360	2.2%
Potentially Recyclable	Milk Cartons	128	0.8%
	Food Trays	64	0.4%
Total		1,602	9.8%

Sources: OLO; MCPS; MSW Consultants, 2007

* based on an assumed 80% capture rate for each material

Nearly all of the potential growth in MCPS recycling is attainable by maximizing the capture of materials currently part of the school recycling program. Given the composition of MCPS waste stream and current recycling markets, the potential yield for paper and commingled containers combined is more than seven times greater than the potential yield of starting new milk container and food tray recycling programs.

Recommended Discussion Issues

POTENTIAL COSTS ASSOCIATED WITH INCREASING THE RECYCLING RATE

The potential costs associated with the different recycling opportunities are summarized below.

Increasing Capture of Current Recyclables: To increase the recycling rate for paper and commingled containers, MCPS would likely incur costs for: more staff training; increased promotional efforts; additional recycling containers; and/or incentives for recycling performance.

Converting to Recyclable Plastic Milk Bottles: MCPS has issued an invitation to bid for the purchase of school milk. The bid specifies a preference for milk in recyclable plastic containers. A two- to four-cent per unit cost increase would raise MCPS expenditures by \$200,000 to \$400,000 per year.

Food Tray Recycling: Implementation of a food tray recycling program would require the execution of a collection contract as well as the purchase of new in-school food tray recycling bins. Discussion with potential food tray recyclers will be necessary to determine the cost of this initiative.

POTENTIAL SAVINGS FROM INCREASED RECYCLING

Trash Collection Savings: If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce average daily trash collection by about eight tons per day. A reduction of this amount might allow MCPS to run eight (instead of ten) trash collection trips per week from each of the four maintenance depots. The reduction of two trips per depot per week would save a combined 40 hours of work time per week. These hours could be assigned to perform truck maintenance and other needed functions. The reduction of truck trips would also lower MCPS fuel and vehicle maintenance costs.

Reduced Tip Fee Costs: MCPS pays a "tip fee" to dispose trash at the County's Transfer Station. The current tip fee is \$56 per ton. If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce its annual tip fee payments by about \$80,000. Implementing milk bottle recycling and food tray recycling at an 80% capture rate would yield an additional \$10,000 in annual savings.

Potential Revenue from Sale of Recyclables: Under the terms of the current recycling hauling contract, MCPS pays a fee for collection of paper and commingled containers based on the number of schools served and the frequency of the collection from each school. MCPS intends to re-bid the contract by the end of the current year. Some recycling collection contracts provide for the sharing of revenues obtained through the sale of recyclables. If the new recycling contract includes a revenue sharing provision, then MCPS could achieve significant savings by increasing the amount of paper and commingled containers recycled.

RECOMMENDED DISCUSSION ISSUES

OLO recommends that the Council hold an initial worksession with MCPS this summer and a follow-up worksession before the end of the calendar year. OLO recommends that the County Council request MCPS to report back by November 1, 2008 on:

- 1) **A plan of action for increasing the capture of paper and commingled containers across the school system.**
- 2) **The operational and cost feasibility associated with converting to recyclable plastic milk bottles and introducing a program for recycling food trays.**
- 3) **Estimates on the potential savings from a reduction in trash generation across all schools.**

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**RECYCLING IN
MONTGOMERY COUNTY PUBLIC SCHOOLS**

TABLE OF CONTENTS

Executive Summary	i-iv
I. Authority, Scope, and Organization of Report	1
II. Overview of the MCPS Recycling Program	4
III. MCPS Waste Composition and Recycling Rates	16
IV. Variations in Recycling Performance by School	20
V. School Characteristics and Recycling Rates.....	27
VI. Recycling in the Cafeteria.....	41
VII. Potential to Increase MCPS Recycling	50
VIII. Findings.....	57
IX. Recommended Discussion Issues	67
X. Agency Comments on Final Draft	70

APPENDIX

Appendix A: Montgomery County Executive Regulation 15-04AM.....	©1
Appendix B: MCPS Regulation ECF-RC	©20
Appendix C: SERT Action Plan form, 2007-08.....	©23
Appendix D: Division of Solid Waste Services School Recycling Evaluation.....	©26
Appendix E: MCPS Solid Waste Audit Executive Summary.....	©27

**RECYCLING IN
MONTGOMERY COUNTY PUBLIC SCHOOLS**

LIST OF TABLES AND EXHIBITS

Number	Tables	Page
2-1	Uncontaminated Items that Must be Recycled	8
3-1	Composition of Trash Disposed by MCPS, 2005-2006	18
3-2	MCPS Disposed Recyclables by School Level, 2005-2006	18
3-3	MCPS Recycling Rates by Material Types, 2006-2007 School Year	19
4-1	Median Pounds of Recycled per Student by Material Type and School Level, 2006-2007 School Year	25
4-2	Ratio of Paper to Commingled Pounds Recycled by School Level, 2006-2007 School Year	26
5-1	Relationship between School Recycling Rates and Quantifiable Characteristics	27
5-2	Recycling Rate Correlation Coefficients	33
7-1	Estimated Paper and Commingled Tonnages and Recycling Rates, 2006-2007 School Year	50
7-2	Effect of 100% Capture of Recyclable Paper and Containers on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate	51
7-3	Effect of 80% Capture of Recyclable Paper and Containers on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate	52
7-4	Weight of Milk Cartons Disposed by MCPS as Trash per Year	52
7-5	Weight of Polystyrene Food Trays Disposed by MCPS as Trash per Year	52

Number	Tables (Continued)	Page
7-6	Effect of 80% Capture of Recyclable Milk Bottles and Food Trays on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate	53
7-7	Effect of 80% Capture of Recyclables on Overall MCPS Recycling Rate	53

Number	Exhibits	Page
2-1	Department of Facilities Management Organization Chart	5
3-1	MCPS Recyclables Defined in Executive Regulation 15-04AM	17
4-1	Distribution of Elementary School Recycling Rates, 2006-2007 School Year	21
4-2	Distribution of Middle School Recycling Rates, 2006-2007 School Year	22
4-3	Distribution of High School Recycling Rates, 2006-2007 School Year	23
4-4	Lowest, Median, Highest Recycling Rates by School Type, 2006-2007 School Year	24
5-1	Elementary School Enrollment and Recycling Rates, 2006-2007 School Year	28
5-2	Middle School Enrollment and Recycling Rates, 2006-2007 School Year	29
5-3	High School Enrollment and Recycling Rates, 2006-2007 School Year	29
5-4	Elementary School Building Sizes and Recycling Rates, 2006-2007 School Year	30
5-5	Middle School Building Sizes and Recycling Rates, 2006-2007 School Year	31
5-6	High School Building Sizes and Recycling Rates, 2006-2007 School Year	31

Number	Exhibits (Continued)	Page
5-7	Elementary Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year	35
5-8	Middle Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year	35
5-9	High Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year	36
6-1	Department of Materials Management Organization Chart	41

CHAPTER I. AUTHORITY, SCOPE, AND ORGANIZATION OF REPORT

A. Authority

Council Resolution 16-260, *Fiscal Year 2008 Work Program of the Office of Legislative Oversight*, adopted July 31, 2007.

B. Purpose and Scope of Report

The County Council directed OLO to prepare a report on recycling in Montgomery County Public Schools (MCPS). This report describes recycling practices in public schools and provides information about overall school system waste generation. The report compares recycling rates among schools, and identifies factors to explain why recycling rates differ by school. Finally, this report evaluates opportunities to increase recycling of school cafeteria waste, and identifies strategies to improve public school recycling rates overall.

Recycling is the process of collecting materials that would otherwise be disposed as trash, and the processing of these materials into new products. The scope of this report primarily focuses on recycling; it does not include a detailed examination of waste reduction and reuse on MCPS waste generation.

C. Organization of Report

Chapter II, Overview of the MCPS Recycling Program, provides an overview of the Montgomery County Public Schools' Recycling Program.

Chapter III, MCPS Waste Composition and Recycling Rates, provides an overview of the composition of the waste generated by MCPS and presents calculations of system-wide and material specific recycling rates.

Chapter IV, Variations in Recycling Performance by School, presents data on variations in the recycling rates in Montgomery County Public Schools.

Chapter V, School Characteristics and Recycling Rates, presents data on the relationship between certain quantifiable and non-quantifiable characteristics of a school and its recycling rate.

Chapter VI, Recycling in the Cafeteria, provides an overview of MCPS food service activities and discusses recycling and waste reduction practices and options in school cafeterias. The chapter also presents case studies of cafeteria recycling and waste reduction initiatives from other school systems.

Chapter VII, Potential to Increase MCPS Recycling, describes the extent to which MCPS may increase its recycling performance and the costs and savings that would result from increased recycling.

Chapter VIII presents a summary of the Office of Legislative Oversight's **Findings**.

Chapter IX presents the Office of Legislative Oversight's **Recommended Discussion Issues**.

Chapter X presents **Agency Comments** received on a final draft of this report.

D. Methodology

Office of Legislative Oversight (OLO) staff members Aron Trombka and Richard Romer conducted this study. OLO gathered information through document reviews, data analysis, and interviews with staff from Montgomery County Public Schools, and the Montgomery County Department of Public Works and Transportation's Division of Solid Waste Services. OLO also conducted Internet research on recycling and waste reduction programs in school systems around the country and made telephone or e-mail contact with program managers to learn more about specific initiatives.

OLO also performed a series of site visits to observe the recycling programs at MCPS schools. OLO visited nine schools of varying levels of recycling performance: three elementary, three middle, and three high schools. OLO interviewed the persons responsible for recycling at each of the schools, including Building Service Managers, Building Recycling Coordinators, faculty, students, and administration.

E. Acknowledgements

OLO received a high level of cooperation from everyone involved in this study. OLO appreciates the significant time commitment, the information shared, and the insights provided by all staff who participated.

In particular, OLO recognizes **Lynne Zarate**, MCPS Environmental Safety Coordinator, for her exceptional cooperation and assistance throughout this project. In addition, OLO thanks the following individuals who provided invaluable input and information:

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- Dr. Beth Brown, Beverly Farms Elementary School
- Sean Bulson, Bethesda-Chevy Chase High School
- David Chia, Rock Creek Forest Elementary School
- Christopher Cram, MCPS Department of Communications
- Curtis Dark, Bethesda-Chevy Chase High School

- Ann Dolan Rindner, Pyle Middle School
- Dr. Michael Doran, Wooton High School
- Bernie Duplan, MCPS Division of Maintenance
- Cynthia Duranko, Monocacy Elementary School
- Stephen Garland, Loiderman Middle School
- Allen Geisler, MCPS Division of Maintenance
- Margy Hall, Pyle Middle School
- Clyde Henderson, Beverly Farms Elementary School
- Angela Henry, Bethesda-Chevy Chase High School
- Roy Higgins, Director, MCPS Division of Maintenance
- Ellen Jimenez, Beverly Farms Elementary School
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CHAPTER II. OVERVIEW OF THE MCPS RECYCLING PROGRAM

Recycling is the process of collecting materials that would otherwise be disposed as trash, and the processing of these materials into new products. This chapter provides an overview of the Montgomery County Public Schools' (MCPS) Recycling Program. Specifically:

- Section A, **Organizational Structure**, describes the organizational structure and staffing of MCPS' Recycling Program;
- Section B, **Regulations and Policies Governing MCPS Recycling**, summarizes the regulations and policies governing MCPS recycling; and
- Section C, **MCPS Recycling Practices and Procedures**, summarizes MCPS recycling procedures, data collection practices, and incentive/promotional programs.

A. Organizational Structure

This section describes the organizational structure and staffing of MCPS' Recycling Program.

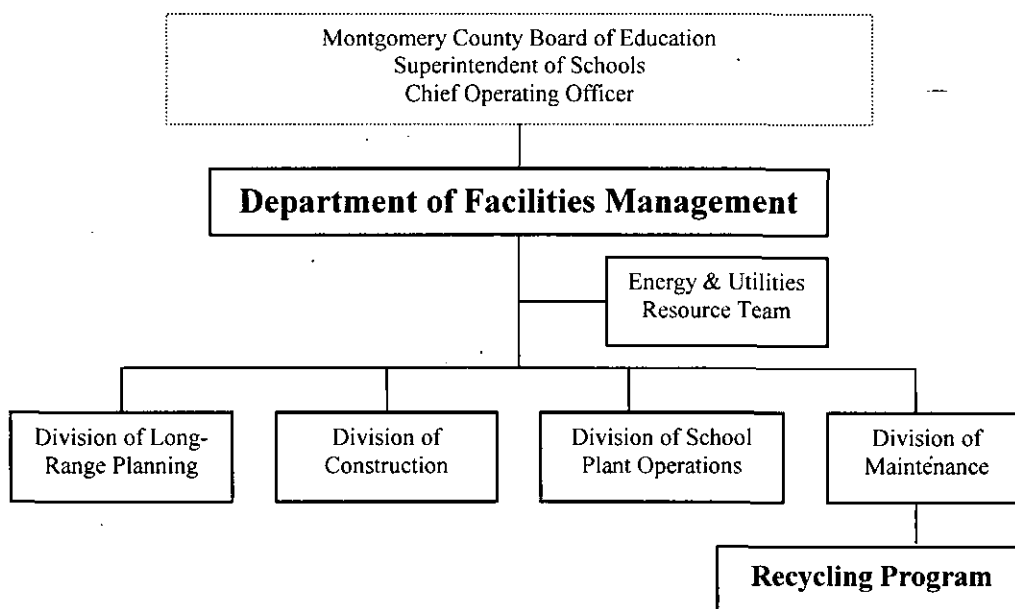
1. MCPS Organization and Staffing

The MCPS Department of Facilities Management is responsible for creating and maintaining MCPS public facilities. Facilities Management is one of eight MCPS departments that report directly to the Office of the Chief Operating Officer, who oversees the business functions and support services for the school system.

Within the Department of Facilities Management, the Division of Maintenance provides, among other things, general maintenance services for MCPS facilities, as well as environmental services, capital asset replacement, and automated energy management services. The Division of Maintenance manages the MCPS Recycling Program.

A chart showing the organizational location of the MCPS Recycling Program within the Department of Facilities Management appears on the next page.

Exhibit 2-1: Department of Facilities Management Organization Chart



The MCPS Recycling Program consists of two centralized positions: an Environmental Safety Coordinator (who is also responsible for other environmental programs), and a Recycling Specialist. School-based building services staff perform recycling tasks as part of their building maintenance responsibilities. In addition, MCPS requires each school to assign one faculty or staff member to serve as the school's Building Recycling Coordinator (hereafter, "Recycling Coordinator").

2. Contracted Recycling Hauling Services

MCPS contracts with a private vendor for the hauling and disposal of recyclable materials from MCPS schools and facilities. The Board of Education approved the current contract with Waste Management, Inc. in 2005. MCPS plans to issue a solicitation for a new recycling contract by the end of 2008.

The contractor provides and maintains large recycling containers at each school for the collection of recyclable materials. Each MCPS facility sorts and separates recyclables into mixed paper and commingled (bottles and cans) containers.

MCPS building services staff place recyclable materials outside for collection on scheduled pick-up days. The contractor collects recyclables from high schools and middle schools twice a week and from elementary schools once a week. Yard trim (also known as "yard waste") is not part of the contract.¹ The contractor charges a once a week pick-up rate of \$97.13 for mixed paper and \$94.34 for commingled containers for each

¹ In-school building service staff collect leaves and other yard trim for collection by centralized MCPS maintenance personnel.

MCPS facility. The charge does not vary by the amount of recyclables removed. The recycling contract costs MCPS approximately \$600,000 per year.²

The Recycling Specialist may also request unscheduled recycling pick-ups with the contractor for an additional fee of \$64 for mixed paper and \$4 for each commingled container cart.

The contractor must provide MCPS with data of the amount of pounds of mixed paper and commingled materials being recycled. Contractors use scales on-board the collection vehicles to determine the weight of mixed paper set out by schools. Contractors visually examine the volume of commingled containers set out for recycling. The weight of the commingled containers is estimated using a volume-to-weight conversion factor. The calculation of recycling rates is discussed in detail in Section C of this chapter.

B. Regulations and Policies Governing MCPS Recycling

This section summarizes the two regulations governing MCPS recycling:

- Executive Regulation 15-04AM; and
- MCPS Regulation ECF-RC.

1. Executive Regulation 15-04AM

Montgomery County Executive Regulation 15-04AM, among other things, sets non-residential recycling and annual reporting requirements. The regulation, which became effective in 2005, updated the 1993 Executive Regulation (109-92AM). Executive Regulation 15-04AM is attached at ©1.

Under Executive Regulation 15-04AM, MCPS is defined as a “business” waste generator. The regulation requires businesses to recycle certain items, submit a waste reduction and recycling plan, and submit an annual waste reduction and recycling report.

The regulation requires MCPS to recycle:

- Mixed or sorted paper;
- Commingled materials;
- Yard trim;
- Christmas trees; and
- Scrap metal items.

² Montgomery County Public Schools “RFP #4127.2BR, Recycling Services,” September 2005.

The regulation requires MCPS to submit a waste reduction and recycling plan, with the goal of reducing solid waste by 50% weight or volume. The plan must identify a waste reduction and recycling coordinator, and must describe the waste generation and waste reduction methods of each facility. The plan must also report the estimated tonnage of solid waste produced, and identify recyclable solid waste.

The regulation requires MCPS to submit an annual waste reduction and recycling report on activities from the previous calendar year by February 1 of each year. The report is required to contain:

- Processes for waste reduction and reuse;
- Efforts to educate employees about the recycling program;
- Contact information of the licensed recycling collector;
- Sites where recyclables are delivered;
- Actual waste and recycling tonnage generation; and
- Quantitative proof of the amount recycling (e.g., scale tickets).

The annual recycling report is reviewed, verified, and audited by the Division of Solid Waste Services in the Department of Public Works and Transportation (DPWT).³

2. MCPS Regulation ECF-RC

The MCPS Superintendent issued Regulation ECF-RC in 2000, which presents the process and guidelines for recycling in MCPS facilities. The regulation makes the Director of the Department of Facilities Management responsible for implementing the recycling program. Regulation ECF-RC is attached at ©20.

As required in the MCPS regulation, school principals must designate a Recycling Coordinator by September 15 of each year. The Recycling Coordinator:

- Completes the annual comprehensive recycling plan, which is endorsed by the facility administrator, and submitted to the Recycling Specialist prior to September 30;
- Provides oversight of the recycling plan; and
- Forms a team of staff, students, and community members to build awareness and support for the school's recycling program.

Upon request, the County Government's Division of Solid Waste Services (DSWS) may also assist in the development of recycling plans.

³ In April 2008, the Council approved a proposal from the County Executive to relocate the Division of Solid Waste Services to the Department of Environmental Protection beginning July 1, 2008.

The MCPS Recycling Specialist assists the Recycling Coordinators and other school-based staff in implementing and maintaining the schools' recycling programs. According to the regulation, the DSWS conducts periodic site evaluations to monitor the effectiveness of recycling programs and provide assistance.

Table 2-1 lists the two major categories of items that must be recycled, in accordance with the MCPS regulation.

Table 2-1: Uncontaminated Items that Must be Recycled

Type	Item
Paper	Office/classroom paper
	Mixed paper
	Magazines
	Printer paper
	Computer paper
	Fax paper
	Corrugated cardboard
	Phone books
	Newspaper
Other	Aluminum cans
	Bi-metal cans
	Glass bottles
	Plastic containers
	Yard trim (grass, leaves, and brush)

Source: MCPS Regulation ECF-RC

MCPS reports that staff are working to update Regulation ECF-RC to align it with Executive Regulation 15-04AM, including the addition of language requiring the recycling of scrap metal.

C. MCPS Recycling Practices and Procedures

This section summarizes MCPS recycling procedures, data collection practices, and incentive/promotional programs.

1. MCPS Centralized Recycling Management

The MCPS Division of Maintenance is responsible for coordinating recycling among MCPS schools and facilities. The MCPS Environmental Safety Coordinator oversees the Recycling Program along with other environmental programs (including the indoor air quality, asbestos abatement, and lead in water programs). The Recycling Specialist is the primary MCPS recycling contact for individual schools.

The Recycling Specialist is responsible for:

- Providing support to each school's Recycling Coordinator and Building Service Manager through training and advice;
- Serving as the contact for purchasing recycling bins and promotional materials for schools; and
- Performing site visits and inspections of MCPS schools and facilities.

In addition, the Recycling Specialist is the primary MCPS contact person for the recycling contractor.

2. School-Based Recycling Practices

Recycling implementation varies from school to school. However, similarities between schools include:

- Locating paper recycling bins in classrooms, copy rooms, offices, computer labs, and the library;
- Locating commingled recycling bins in the cafeteria, main office, and staff/faculty lounge; and
- Periodic emptying of recycling bins and the placement of recyclables in outdoor recycling containers for pick up by a private contractor.

School-based recycling staff consist of building service workers, the Recycling Coordinator, and other members of the school's "recycling team," including administrators, faculty members, students and parents.

Building Service Workers. A Building Service Manager directs each school's building service staff, and coordinates the management and general upkeep of school buildings and grounds. The responsibilities of building service workers include daily cleaning; replenishing restroom supplies; maintaining and operating cleaning equipment and heating, ventilation, and air conditioning (HVAC) systems; and caring for the school grounds.

MCPS allocates building service workers to schools based on the square footage of the building. An elementary school receives one building service worker per 17,000 square feet of building space; a middle school receives one worker per 18,000 square feet; and a high school receives one worker per 19,000 square feet.

Among other duties, MCPS building service workers are responsible for the emptying and collection of trash and recycling bins around the school grounds. In many schools, students assist in the collection of recyclables.

Building service workers are responsible for depositing mixed paper and commingled materials in the correct containers for pick-up by the recycling contractor. This involves:

- Breaking down cardboard and placing it in the mixed paper dumpster;
- Depositing bottles and cans into totes containing commingled materials, and placing the totes at the designated pickup area by 7 a.m. on recycling pickup days;
- Locking recycling dumpsters to prevent contamination; and
- Ensuring the pick-up area is accessible to the recycling contractor's trucks.

The MCPS Recycling Specialist schedules recycling pickups and provides the schedule to each school. The Building Service Manager can request additional recycling pickups as needed by contacting the Recycling Specialist.

Building Recycling Coordinator. As mentioned above, the Building Recycling Coordinator is the designated head of each school's recycling program. Schools may designate the Building Service Manager or another school staff or faculty member to serve as the Recycling Coordinator. Recycling Coordinators' responsibilities and involvement vary from school to school. Some of the duties assumed by Recycling Coordinators include:

- Establishing a student recycling team to collect recyclable paper or to monitor the condition of recycling containers;
- Overseeing recycling promotion efforts including poster contests, competitions, and public address announcements;
- Educating staff and students about the school's recycling program; and/or
- Updating staff and students on the progress of the recycling program.

Many Recycling Coordinators also serve as the contact person for recycling questions and additional recycling container requests. In high schools, the school's Business Manager coordinates purchases of recycling bins and other related building supplies.

3. SERT Action Plan

MCPS requires that all schools and facilities submit a Recycling Plan as part of the School Eco Response Team (SERT) Action Plan. The SERT Action Plan is due by September 30 each school year. A copy of the 2007-2008 school year SERT Action Plan form is attached at ©23.

The SERT Action Plan includes two components: energy conservation and recycling. The recycling component includes the recycling goal for the next school year, recycling program expectations, suggested best practices, and recycling pickup procedures. The recycling program's expectations follow the requirements of Executive Regulation 15-04AM.

The Recycling Plan states that each school should:

- Label each recycling container to indicate contents;
- Place appropriate recycling containers near each trash container;
- Place a paper recycling container near each trash can in classrooms and offices;
- Place a paper recycling container near copiers and printers;
- Place a commingled recycling container near each vending machine that dispenses products in recyclable packaging;
- Place commingled recycling containers in the kitchen and cafeteria areas; and
- Empty recycling containers on a regular schedule.⁴

The Recycling Coordinator serves as the school's designated Recycling Team Captain. Each school also must assemble a "Recycling Team" (in addition to school administrators). MCPS encourages schools to include students, staff, and/or building service employees as Recycling Team members.

Through site visits, OLO observed that the composition of this recycling team varies by school. The recycling team may consist of the Building Service Manager alone, or may also include some combination of teachers, environmental science classes, National Honors Society members, student environmental club members, special education classes, and the parent teacher association.

While MCPS provides financial awards for SERT Plan implementation, which includes the school's Recycling Plan, the awards are based solely on energy conservation and performance. In addition, schools receive a \$100 award for submitting their SERT plan on time each September.

Coordination with Division of Solid Waste Services. The Division of Solid Waste Services (DSWS) assists MCPS to improve its recycling performance. DSWS provides support to schools that request assistance developing their Recycling Plan.

The Division Solid Waste Services also conducts annual, unannounced site visits to evaluate the recycling program in each school. DSWS staff complete a standardized "School Recycling Evaluation" that focuses on the presence of the school's basic recycling infrastructure. A copy of the School Recycling Evaluation is found at ©26.

⁴ Montgomery County Public Schools. "2007-2008 SERT Action Plan." 2007.

The School Recycling Evaluation assigns points for:

- Collection;
- Program promotion;
- Convenience;
- Recycling bins;
- Contamination;
- Recyclables in the trash;
- Administration and staff participation;
- Recycling plan
- Student participation; and
- Yard trim collection.

At the end of the site evaluation, DSWS assigns a letter grade (A through F) to each school based on the number of points earned. DSWS staff provide copies of the evaluation to the principal, Recycling Coordinator, Department of Facilities Management, and the recycling contractor. DSWS staff also provide a checklist of recommended actions for improvement to the school's Recycling Coordinator. DSWS re-evaluates each school that receives a grade of "D" or lower.

4. Collection and Reporting of MCPS Recycling Data

MCPS compiles data on the amount of materials collected for recycling from each school. The Department of Facilities Management is responsible for collecting and reporting recycling data. The Department receives recycling data from each school/facility and receives trash disposal information from the County's Solid Waste Transfer Station.

MCPS' recycling program focuses primarily on mixed paper products (office paper, newspaper, magazines, cardboard, etc.), commingled containers (aluminum, bi-metal, plastic, and glass bottles and cans), yard trim (leaves, grass, brush, and other yard trimmings), and scrap metal (metal and predominantly metal items such as chairs, desks, doors, and cabinets). All students, faculty, and staff have an opportunity to recycle paper and commingled containers on a daily basis. In contrast, only a few members of building services staff are involved in recycling yard trim and scrap metal.

Sources of Data. The following sources of data are used to calculate the recycling rate:

- **Mixed paper materials (P)** – Scales on the recycling contractor's vehicles weigh and record the weight of mixed paper collected from each school.
- **Commingled containers (C)** – MCPS obtains commingled material weights from a combination of measured and estimated values. Some schools have

commingled recycling dumpsters that are emptied by vehicles with on-board scales. For most schools, the recycling contractor calculates the weight of commingled materials by visually estimating the volume of materials in the containers and then multiplying that result by a volume-to-weight conversion factor.

- **Yard trim (Y)** – MCPS receives reports indicating the total weight of public school yard trim delivered to the County’s Solid Waste Transfer Station. MCPS divides the total weight of yard trim for the entire school system by the total school system enrollment to produce an average number of pounds of yard trim generated per student. MCPS then allocates yard trim pounds to each school based on its enrollment.
- **Scrap Metal (S)** – MCPS receives reports indicating the total weight of scrap metal collected for recycling from public schools. MCPS divides the total weight of scrap metal for the entire school system by the total school system enrollment to produce an average number of pounds of scrap metal generated per student. MCPS then allocates scrap metal pounds to each school based on its enrollment.
- **Total recycled material (R)** – Total recycled materials is the sum of mixed paper, commingled materials, yard trim, and scrap metal weight calculations.

$$\text{Total Recycled Material: } R = P + C + Y + S$$

- **Trash (T)** – MCPS receives reports indicating the total weight of public school trash delivered to the County’s Solid Waste Transfer Station. MCPS divides the weight of trash for the entire school system by the total school system enrollment to produce an average number of pounds of trash generated per student. MCPS then allocates trash tonnages to each school based on its enrollment.
- **Recycling Rate.** The recycling rate equals total recycled material divided by the sum of total recycled material and trash.

$$\text{Recycling Rate} = R / (R + T)$$

In accordance with the requirements of Executive Regulation 15-04AM, MCPS submits system-wide recycling rate reports to DSWS. MCPS also provides recycling reports to individual schools.

5. Incentives and Promotions

As part of the Recycling Program, MCPS runs several incentives and promotional programs to improve school recycling rates.

Incentives. MCPS offers several incentives for recycling, including:

- **Poster contest** – MCPS, the Division of Solid Waste Services, and Waste Management (MCPS' recycling collection contractor) co-sponsor a recycling poster contest for students. The Division of Solid Waste Services coordinates and hosts an awards banquet and ceremony to honor contest winners. MCPS rewards the winning students' schools with up to \$100 to use on their recycling programs. Schools with multiple winning students receive multiple awards. Waste Management provides gift cards from \$5 to \$30 to contest winners.
- **Staff recognition** – MCPS acknowledges building service workers and school recycling coordinators who have made a significant contribution to their school's recycling program. Recognition has come in several forms including an awards ceremony, letters of commendation, and complementary e-mails.
- **SERT Awards** – MCPS offers SERT awards ranging from \$500 to \$5,000 to schools that excel in energy conservation. Beginning next school year, MCPS will limit the awards to schools that receive a passing recycling grade from the Division of Solid Waste Services.

Through site visits, OLO observed other incentives provided at some individual schools to increase recycling, including:

- Offering community service hour credits for students who participate in recycling activities;
- Providing t-shirts for members of the student recycling team; and
- Recognition of classrooms with high amounts of recycling in the morning announcements.

Publications and Promotion. MCPS educates and updates staff, students, and parents on the recycling program through various forms of publications and promotion. These include:

- **SERT newsletter** – Monthly publication about energy conservation and recycling in schools and facilities.
- **Recycling brochure** – Publication that provides information on the Recycling Program, including references to the MCPS Recycling website, what can be recycled in schools, and the process of implementing a school recycling program.
- **Recycling website** – Online information on the MCPS recycling program, including fun facts, recycling bin ordering information, school-by-school recycling data, and regulations.
- **Recycling Curriculum** – Supplementary lesson plans on recycling topics for use at the discretion of the classroom teacher as time permits.

Through site visits, OLO observed other promotional efforts used by some schools to increase recycling, including:

- Field trips to the County's Recycling Center;
- Notes in school newsletters;
- School assemblies about recycling; and
- Recycling information during the morning announcements.

CHAPTER III. MCPS WASTE COMPOSITION AND RECYCLING RATES

Waste consists both of materials recycled and materials disposed as trash. Moreover, some recyclable materials are disposed in the trash instead of being recycled. Recycling and trash data provide information necessary to calculate the recycling rate, an important measure of an organization's recycling performance.

This chapter provides an overview of the composition of the waste generated by Montgomery County Public Schools (MCPS) and presents calculations of system-wide and material specific recycling rates.

- Section A, **Materials Recycled and Disposed by MCPS**, describes the major components of the MCPS waste disposal stream.
- Section B, **MCPS Waste Composition**, summarizes the findings of the MCPS waste composition study; and
- Section C, **Recycling Rate Calculation**, describes the calculation of MCPS' overall recycling rate;
- Section D, **Recycling Rates by Material Type**, presents MCPS system-wide recycling rates by material type.

A. Materials Recycled and Disposed by MCPS

This section describes the major components of the MCPS waste disposal stream. For the purposes of this report, the MCPS waste stream is broken down into two components: recycled materials and disposed materials.

1. Materials Recycled in Schools

As referenced in Chapter II, Executive Regulation 15-04AM and MCPS Regulation ECF-RC mandate recycling of certain materials in schools. These include:

- Commingled materials;
- Mixed paper and cardboard;
- Scrap metal items; and
- Yard trim.

Exhibit 3-1 on the following page defines each of these types of recyclable materials.

Exhibit 3-1: MCPS Recyclables Defined in Executive Regulation 15-04AM

“Commingled materials” means acceptable items such as aluminum cans and foil products, bi-metal cans, glass bottles and jars, and plastic narrow neck bottles, which are not separated by type, but are mixed together in one container.

“Mixed Paper” means acceptable paper items which are not separated by type, but are mingled and collected together. These items include white paper, colored paper, corrugated cardboard, boxboard, newspapers and inserts, magazines, catalogues, telephone directories, paperback books, unwanted mail, and other clean, dry paper.

“Scrap Metal” means acceptable items consisting of metal and/or predominantly metal materials. These items include washers, dryers, refrigerators, air conditioners, dishwashers, sinks, stoves, freezers, furnaces, hot water heaters, trash compactors, iron furniture, doors, cabinets, humidifiers/dehumidifiers, bikes, swing sets, aluminum lawn chairs, shower stalls, and disassembled metal sheds.

“Yard Trim” means leaves, grass, garden trimmings and brush.

2. Materials Disposed in Schools

MCPS generates trash consisting of both recyclable and non-recyclable materials. These materials include:

- **Recyclables disposed as trash** – paper, commingled containers, scrap metal, and yard trim that could have been recycled through the MCPS recycling program but were disposed as trash instead.
- **Potentially recyclable materials** – materials such as polystyrene food trays that are potentially recyclable but currently are not part of the MCPS recycling program (see Chapter VI).
- **Potentially compostable materials** – materials such as food waste that are potentially compostable but currently are not part of the MCPS recycling program (see Chapter VI).
- **Non-recyclable materials** – Non-recyclable paper products, containers and other materials that are not commonly recycled.

B. MCPS Waste Composition

MCPS contracted with a consultant to study the composition of waste generated by schools from December 2005 to August 2006. The consultant conducted an audit of trash from a representative sample of 20 elementary, nine middle, and 14 high schools. The study determined the relative percentages of the different materials thrown out by schools (measured by weight). The study also identified the differences in waste composition among elementary, middle, and high schools.¹ A copy of the study is attached at ©27.

¹ Mid Atlantic Solid Waste Consultants, LLC. “Four Season Waste Characterization Study.” Montgomery County Public Schools. January 2007.

1. Waste Stream Composition by Material

The composition study broke down the major categories of materials in the MCPS waste stream by weight during the study period. Table 3-1 shows the major categories of materials disposed by MCPS during the 2005-2006 school year. Paper products represent the largest percentage of recyclable materials disposed as trash. Food waste is the largest non-recyclable component of MCPS' trash. Table 3-1 also shows that over 25% of the trash disposed by MCPS potentially could have been recycled in the 2005-2006 school year.

Table 3-1: Composition of Trash Disposed by MCPS, 2005-2006

Material		Percent
Recyclables	Recyclable Paper Products	15.9%
	Recyclable Commingled Containers	7.7%
	Yard Trim / Wood	1.1%
	Scrap Metal	0.4%
Non-Recyclables	Food Waste	26.0%
	Non-Recyclable Paper	21.0%
	Non-Recyclable Plastics	12.5%
	Other Non-Recyclable Materials	15.4%
Total		100.0%

Source: MSW Consultants, 2007

Table 3-2 shows disposed recyclables by school level. High schools throw out more recyclables (28.4%) than elementary (21.7%) or middle schools (20.7%).

Table 3-2: MCPS Disposed Recyclables by School Level, 2005-2006

Disposed Recyclable Material	Elementary Schools	Middle Schools	High Schools	MCPS Aggregate
Paper Products	14.4%	14.6%	18.8%	15.9%
Commingled Containers	7.3%	6.1%	9.6%	7.7%
Total Recyclables	21.7%	20.7%	28.4%	23.6%

Source: MSW Consultants, 2007

C. Recycling Rate Calculation

As detailed in Chapter II, the recycling rate equals the amount of a material recycled (*R*) divided by the amount of materials recycled (*R*) plus the amount of the material disposed as trash (*T*).

$$\text{Recycling Rate} = \frac{\text{Recycling Tons (R)}}{\text{Recycling Tons (R) + Trash Tons (T)}}$$

MCPS provided OLO with actual recycling tonnage (*R*) data for the 2006-2007 school year. OLO estimated paper and commingled container tons disposed as trash (*T*) by multiplying material-specific waste stream percentages from the waste composition study by the total number of tons disposed by MCPS at the County Transfer Station during the 2006-2007 school year.

As detailed below, MCPS achieved an overall recycling rate of 27% in the 2006-2007 school year.

D. Recycling Rates by Material Type

OLO used the composition study findings to determine the MCPS recycling rates by material type for the 2006-2007 school year. As shown in Table 3-3, OLO calculated that MCPS achieved an overall recycling rate of 27% in the 2006-2007 school year. The remaining 73% of MCPS' waste stream that is not recycled includes food waste, non-recyclable paper and plastics as well as recyclable paper and containers that were disposed as trash.

Despite the presence of large quantities of recyclables in the trash, the MCPS recycling program has captured significant amounts of paper and commingled containers for recycling. As shown in Table 3-3, MCPS recycles about 57% of recyclable paper and 42% of commingled containers.

Table 3-3: MCPS Recycling Rates by Material Types, 2006-2007 School Year

Material Type	Recycling Rate
All Materials	27%
Recyclable Paper	57%
Commingled Containers	42%
Yard Trim	57%
Scrap Metal	50%

Source: MSW Consultants; MCPS; OLO

Chapter VII of this report addresses the topic of attainable potential growth in the MCPS recycling rate.

CHAPTER IV: VARIATIONS IN RECYCLING PERFORMANCE BY SCHOOL

This chapter presents data on variations in the recycling rates in Montgomery County Public Schools. The chapter also identifies recycling generation rates and the major contributor to public school recycling.

This chapter consists of three sections:

- Section A, **Variations in Overall Recycling Rate by School Level**, presents information on the range of recycling rates in MCPS elementary, middle and high schools.
- Section B, **Amount of Materials Recycled in Schools**, presents data on the average amount of materials recycled per student in different schools.
- Section C, **Paper and School Recycling Rates**, describes the prominent role of paper recycling in determining a school's overall recycling rate.

A. Variations in Overall Recycling Rate by School Level

As mentioned in Chapter II, recycling rate refers to the amount of material recycled (measured by weight) as a percentage of total waste generated (both trash and recycled materials, measured by weight). A review of recycling rates for each MCPS school offers a useful way to compare the recycling performance of different schools and to identify the range of recycling performance among a group of schools.

This section presents recycling rate data for all MCPS schools. OLO calculated recycling rates for each school, using school by school recycling and trash generation data collected by MCPS for the 2006-2007 school year. OLO also examined this data sorted by school level (elementary, middle, and high).

OLO found recycling rates varied widely within each school level. Average recycling rates by school level differed as well.

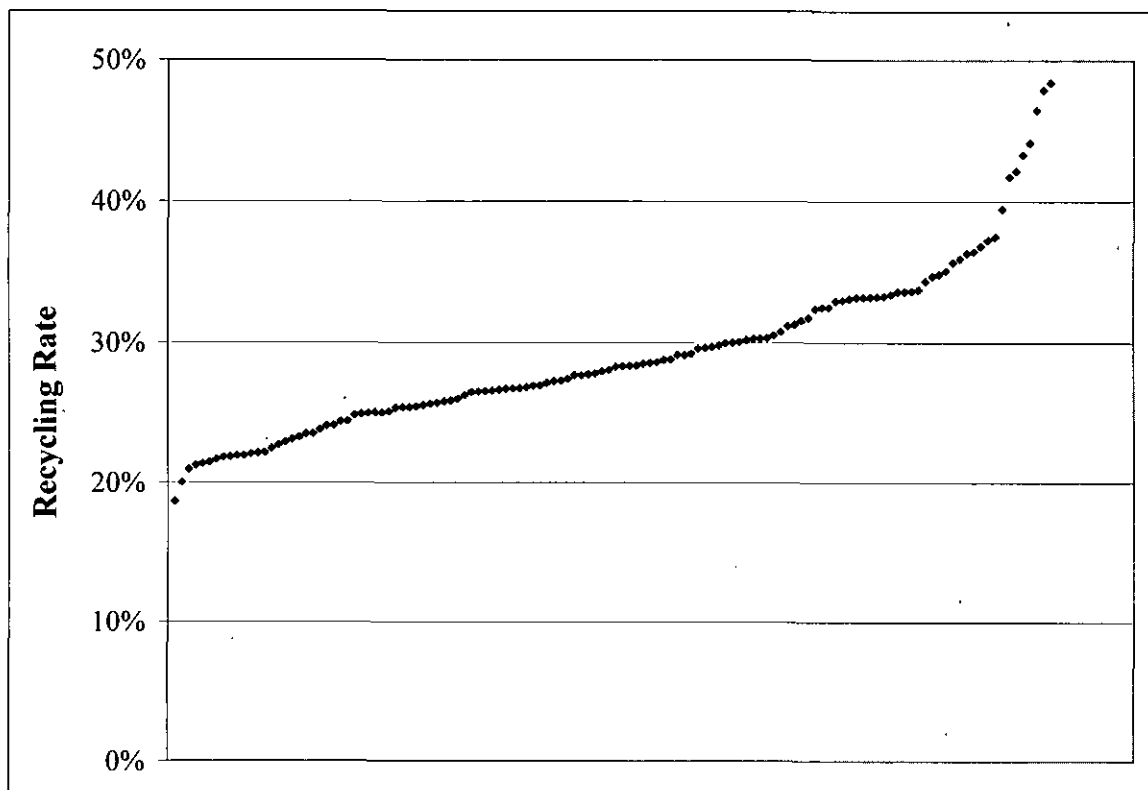
1. Elementary Schools

In the 2006-2007 school year, there were 129 public elementary schools in the County. These elementary schools recycled a combined total of about 1,600 tons last year.

Exhibit 4-1 shows the distribution of recycling rates among MCPS elementary schools.¹ The data show recycling rates in elementary schools vary widely. During the 2006-2007 school year, recycling rates for MCPS elementary schools ranged from 18.7% to 61.1%. Moreover, recycling rates at the ten top performing elementary schools were more than double the rates at the ten elementary schools with the lowest recycling rates. At 61.1%, Monocacy Elementary School was an outlier since its rate was 12.7% higher than the school with the second highest recycling rate (48.4%).

The median 2006-2007 school year recycling rate for elementary schools was 28.3%.

Exhibit 4-1: Distribution of Elementary School Recycling Rates, 2006-2007 School Year



Sources: MCPS, OLO

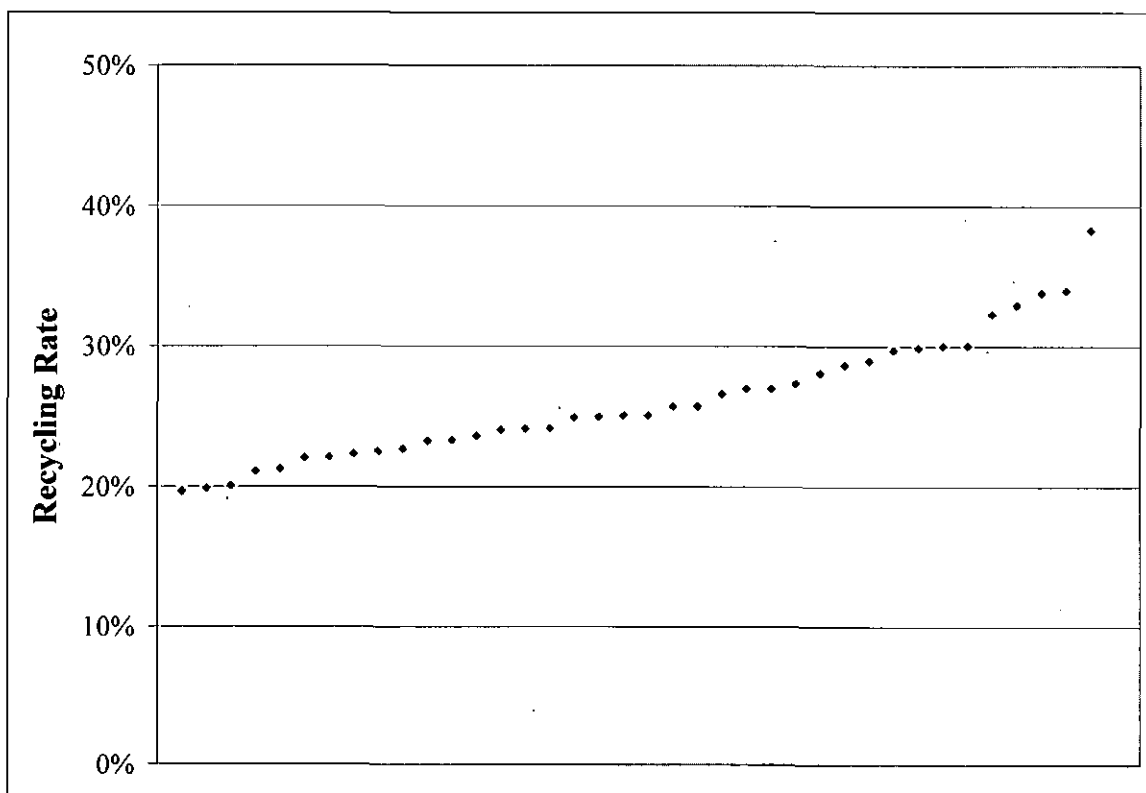
¹ To maintain a consistent scale for the recycling rate charts on this and the following page, Exhibit 4-1 does not show the outlying school that achieved a 61.1% recycling rate.

2. Middle Schools

In the 2006-2007 school year, there were 38 public middle schools in the County. These middle schools recycled a combined total of about 600 tons last year.

Exhibit 4-2 shows the distribution of recycling rates among MCPS middle schools. The data show recycling rates in middle schools vary widely. During the 2006-2007 school year, middle school recycling rates ranged from 19.7% to 38.3%. The median recycling rate for middle schools was 25.1%.

Exhibit 4-2: Distribution of Middle School Recycling Rates, 2006-2007 School Year



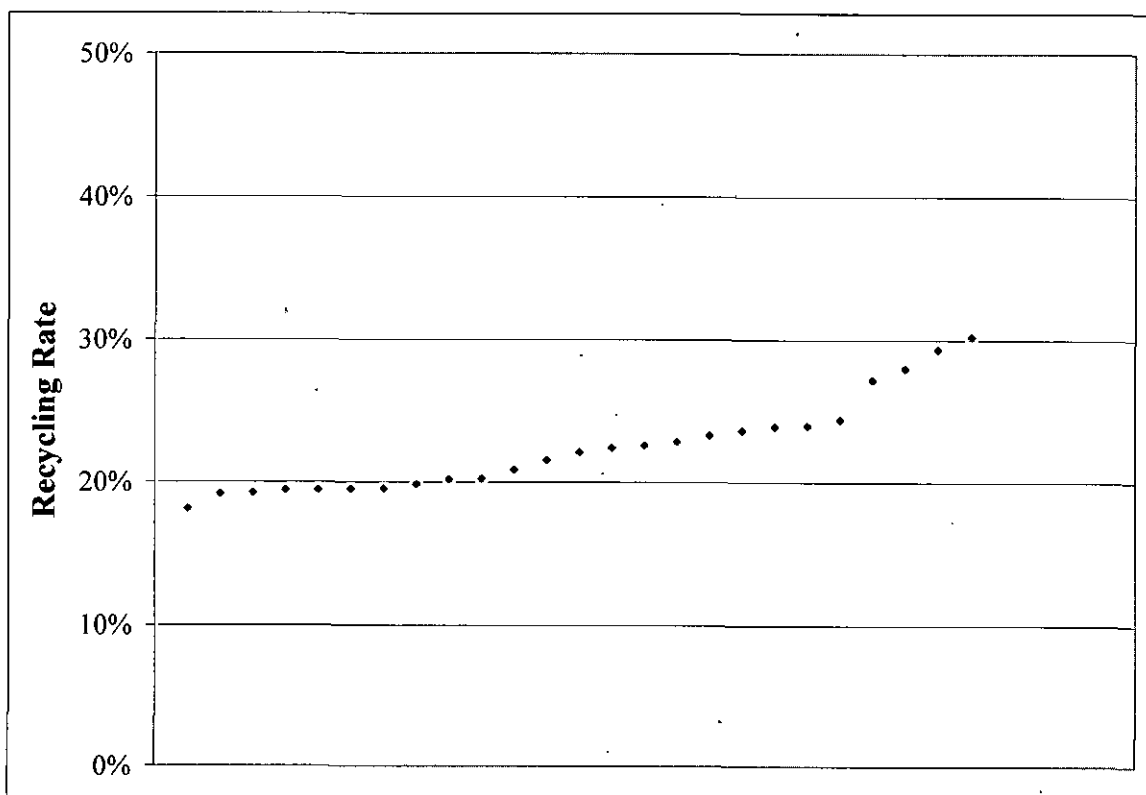
Sources: MCPS, OLO

3. High Schools

In the 2006-2007 school year, there were 25 public high schools in the County. These high schools recycled a combined total of about 700 tons last year.

Exhibit 4-3 shows recycling rates at MCPS high schools varies widely, and that recycling rates at some schools are nearly double those of others. During the 2006-2007 school year, high school recycling rates ranged from 18.2% to 30.2%. The median recycling rate for high schools was 22.1%.

Exhibit 4-3: Distribution of High School Recycling Rates, 2006-2007 School Year

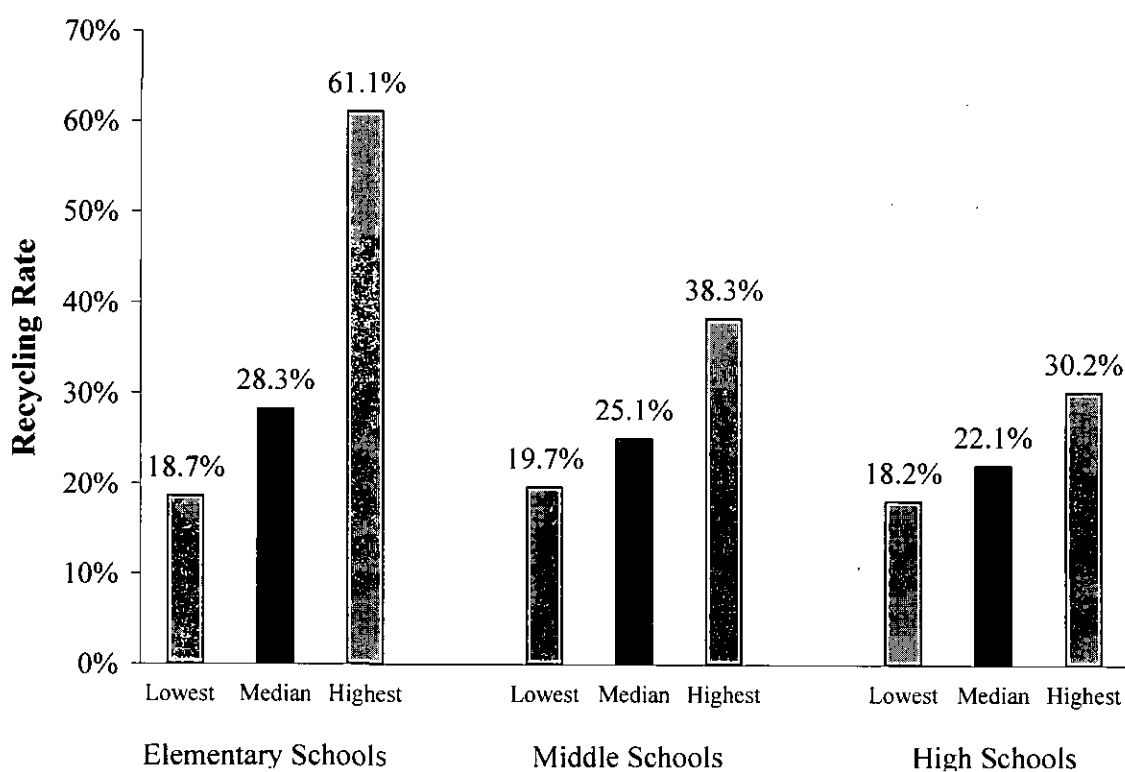


Sources: MCPS, OLO

4. Differences in Median Recycling Rate by School Level

Exhibit 4-4 displays the lowest, median, and highest recycling rates for MCPS elementary, middle, and high schools. A comparison of the median rates shows elementary schools had the highest median recycling rate (28.3%) compared to 25.1% for middle schools and 22.1% for high schools. A comparison of the difference between the highest and lowest recycling rates at each school level shows the gap was greater for elementary schools (42.4%) than for either middle schools (18.6%) or high schools (12.0%).

**Exhibit 4-4: Lowest, Median, Highest Recycling Rates by School Type
2006-2007 School Year**



Sources: MCPS, OLO

B. Amount of Materials Recycled in Schools

As described in Chapter III, the MCPS recycling program focuses primarily on paper products (office paper, newspaper, magazines, cardboard, etc.) and commingled containers (aluminum, bi-metal, plastic, and glass bottles and cans). MCPS compiles data on the amount of materials collected for recycling from each school. (See Chapter II for a description of MCPS data collection methods). The MCPS recycling collection data contain valuable information about the different levels of recycling achievement in County public schools.

Table 4-1 presents data on the median pounds of paper products and commingled containers recycled per student by material type and school level for the 2006-2007 school year.

Table 4-1: Median Pounds Recycled per Student by Material Type and School Level, 2006-2007 School Year

School Level	Paper Products	Commingled Containers
Elementary	40.5 lbs.	1.3 lbs.
Middle	31.8 lbs.	2.0 lbs.
High	23.7 lbs.	2.5 lbs.

Sources: MCPS, OLO

A comparison of the average pounds of paper versus commingled container recycling shows a disparity in the two materials' contribution to a school's recycling rate.

1. Paper Products

On average, elementary school students recycle much more paper than middle or high school students. With a median rate of over 40 pounds of paper per student per year, elementary schools recycled, on average, 27% (or nine pounds) more paper per capita than middle schools, and 71% (or 17 pounds) more paper per capita than high schools.

The average amount of paper recycled per student by school varies widely. At each school level, schools with the highest per student paper averages recycled more than twice the paper per student than schools with the lowest averages. For example, a student attending the elementary school with the highest paper recycling rate recycled 4.5 times more paper than his or her counterpart at the elementary school with the lowest rate.

2. Commingled Containers

In contrast to paper products, high school students recycle much more commingled containers per student than middle or elementary school students. With a median rate of 2.5 pounds per student, high school students recycled, on average, 25% (or 0.5 pounds) more commingled containers per capita than middle schools, and 92% (or 1.2 pounds) more commingled containers per capita than elementary schools.

This disparity reflects the fact that high school students have greater access to vending machines that sell beverages packaged in aluminum cans and plastic bottles. Most middle schools limit access to vending machines during school hours while elementary school students generally do not have any access to vending machines.

As with paper products, a comparison of the average pounds of commingled containers recycled per capita shows the averages vary greatly by individual schools. At each school level, the students at schools with the highest per capita averages (of commingled containers) recycle more than twice as much as students at schools with the lowest per capita averages. For example, a student who attends the high school with the highest per capita commingled container recycling rate recycled 2.3 times more containers than a student who attends the high school with the lowest average rate.

C. Paper and School Recycling Rates

As evident in Table 4-1, paper recycling is the dominant contributor to school recycling. In fact, paper products comprise approximately three-quarters (measured by weight) of all school recycling. The remaining one-quarter of MCPS recycling tons consists of commingled containers, yard trim (grass, leaves, and brush), scrap metal, and miscellaneous other products.

Table 4-2 displays the ratio between the median pounds of paper recycled per student to the median pounds of commingled containers recycled per student. In the 2006-2007 school year, elementary schools recycled 31 times more paper than commingled containers (measured by weight). At the high school level, where per capita paper recycling rates are relatively low and per capita commingled container recycling rates are relatively high, paper still dominates the recycling calculation. The data show paper contributes nine times more weight than commingled containers.

**Table 4-2: Ratio of Paper to Commingled Pounds Recycled by School Level
2006-2007 School Year**

School Level	Median Pounds Recycled per Student		Ratio of Paper Pounds to Commingled Pounds
	Paper Products	Commingled	
Elementary	40.5 lbs.	1.3 lbs.	31 to 1
Middle	31.8 lbs.	2.0 lbs.	16 to 1
High	23.7 lbs.	2.5 lbs.	9 to 1

Sources: MCPS, OLO

CHAPTER V: SCHOOL CHARACTERISTICS AND RECYCLING RATES

This chapter presents quantitative data and site visit observations assessing factors that affect a school's recycling rate. OLO used quantitative tests to determine whether certain characteristics such as school enrollment or building size influence a school's recycling rate. This chapter also provides observations gathered from school site visits to identify non-quantifiable school characteristics that affect recycling rates. This chapter consists of six sections:

- Section A, **Quantifiable School Characteristics Tested**, lists the quantitative measures tested by OLO for a relationship between school characteristics and recycling rates.
- Section B, **School Size**, presents data demonstrating a relationship between the size of a school and its recycling rate.
- Section C, **Quantifiable School Characteristics Not Correlated to Recycling Rate**, identifies several quantitative school characteristics with no apparent relationship to recycling performance.
- Section D, **Statistical Analysis of Correlation**, presents a statistical measure of the relationships between school recycling rates and several quantifiable school characteristics.
- Section E, **Geographic Distribution of Schools by Recycling Rate**, illustrates the geographic locations of schools with the highest and lowest recycling rates.
- Section F, **Observed Practices of Schools with High Recycling Rates**, describes OLO's observations of the non-quantifiable school characteristics most associated with high recycling rates.

A. Quantifiable School Characteristics Tested

OLO tested various quantitative measures to determine whether a correlation exists between these measures and a school's recycling rate. OLO sought to discover whether the distribution of recycling rates among MCPS schools corresponds to certain quantitative measures that also vary among MCPS schools.

Table 5-1 shows the measures tested by OLO for a relationship to school recycling rates. As described in the next two sections, OLO found a correlation between recycling performance and two measures of school size (enrollment and building size). However, the results of OLO's analysis indicate no apparent correlation between recycling performance and the other quantifiable school characteristics: building age, portable classrooms, and student demographics.

Table 5-1: Relationship between School Recycling Rates and Quantifiable Characteristics

Evidence of Relationship	No Evidence of Relationship
<ul style="list-style-type: none">• School enrollment• Building size	<ul style="list-style-type: none">• Building age• Portable classrooms• Student demographics

B. School Size

This section presents data to show the relationship between a school's recycling rate and the school's size. OLO measured school size in two ways:

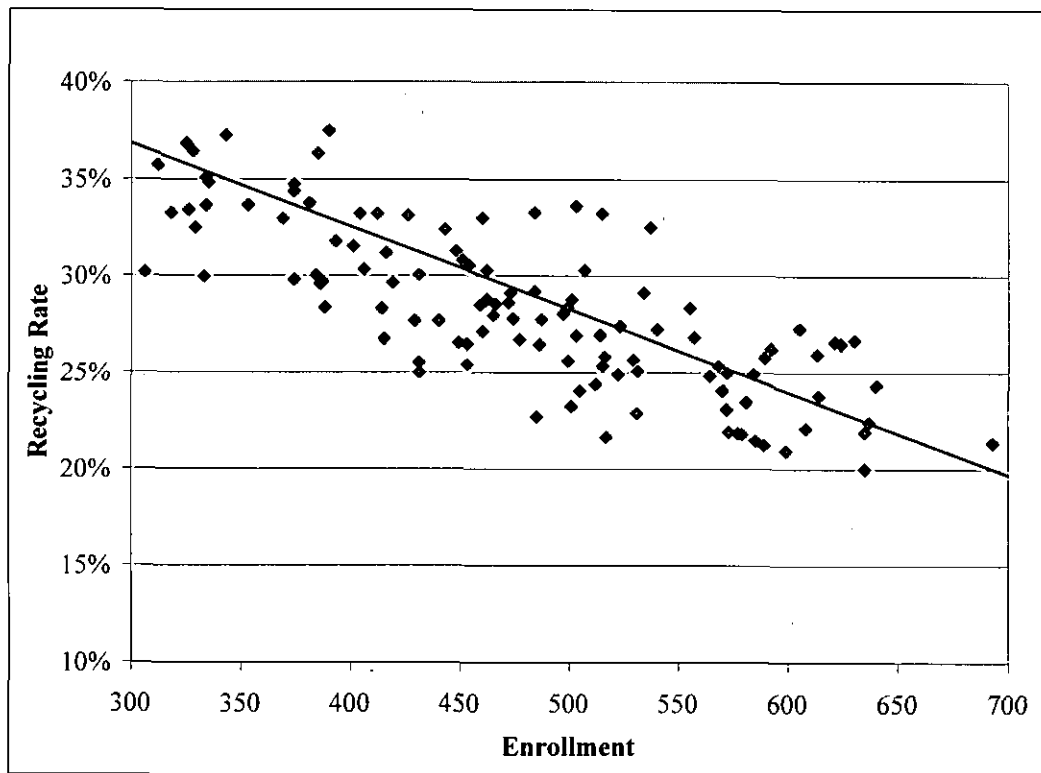
- Student enrollment; and
- Building size.

For both of these measures, OLO identified an inverse relationship between school size and recycling. In other words, the data show that larger schools tend to have lower recycling rates.

1. Enrollment

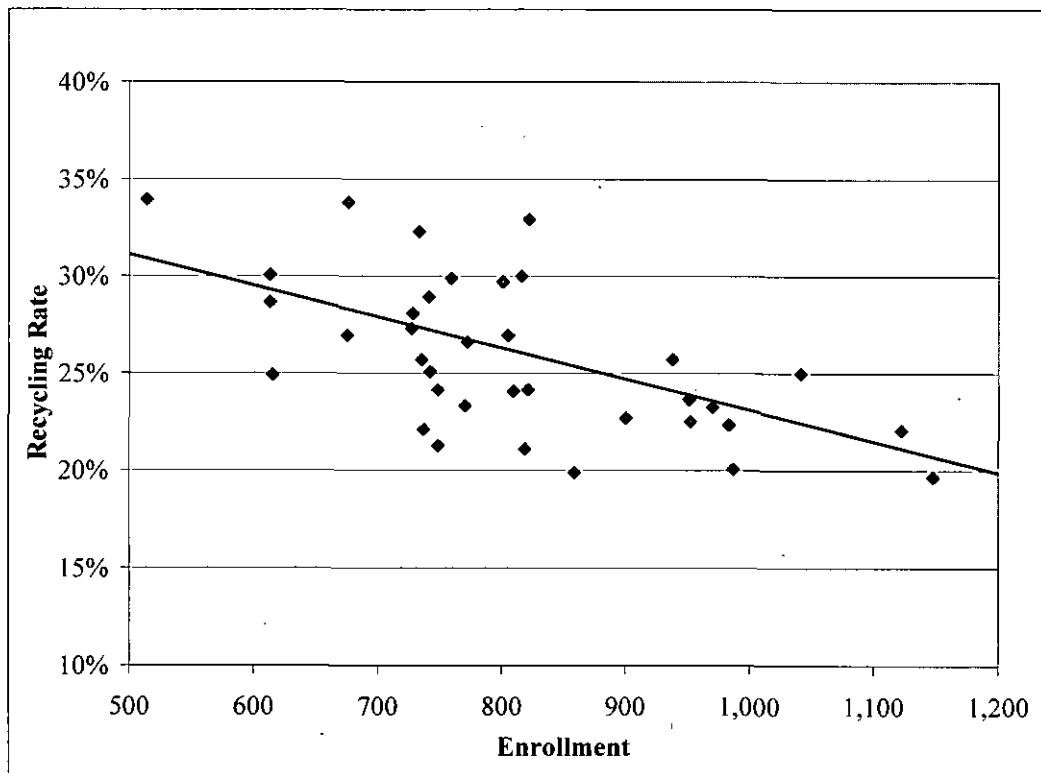
OLO compared 2006-2007 school year recycling rates to school enrollment data for all MCPS schools. As described in Chapter IV, elementary schools generally have higher recycling rates and lower enrollments than middle schools, and middle schools generally have higher recycling rates and lower enrollments than high schools. As shown in Exhibits 5-1 to 5-3, within each school level (elementary, middle, and high), a correlation exists between enrollment and recycling rates.

Exhibit 5-1: Elementary School Enrollment and Recycling Rates, 2006-2007 School Year



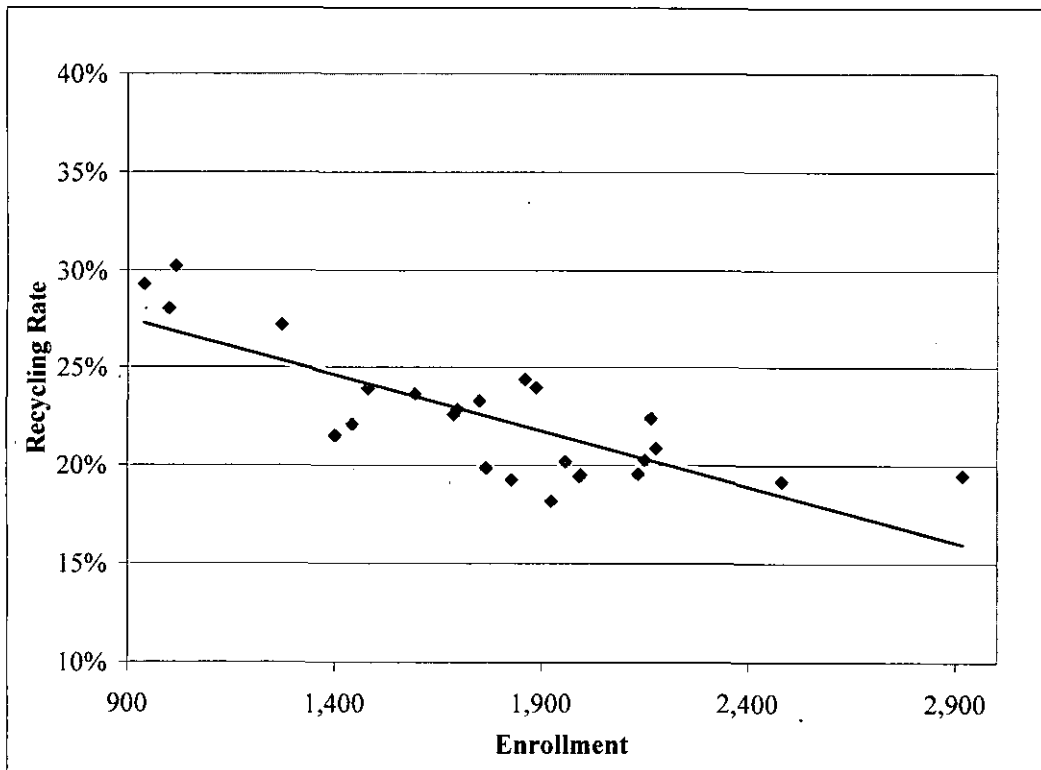
Source: MCPS, OLO

Exhibit 5-2: Middle School Enrollment and Recycling Rates, 2006-2007 School Year



Source: MCPS, OLO

Exhibit 5-3: High School Enrollment and Recycling Rates, 2006-2007 School Year



Source: MCPS, OLO

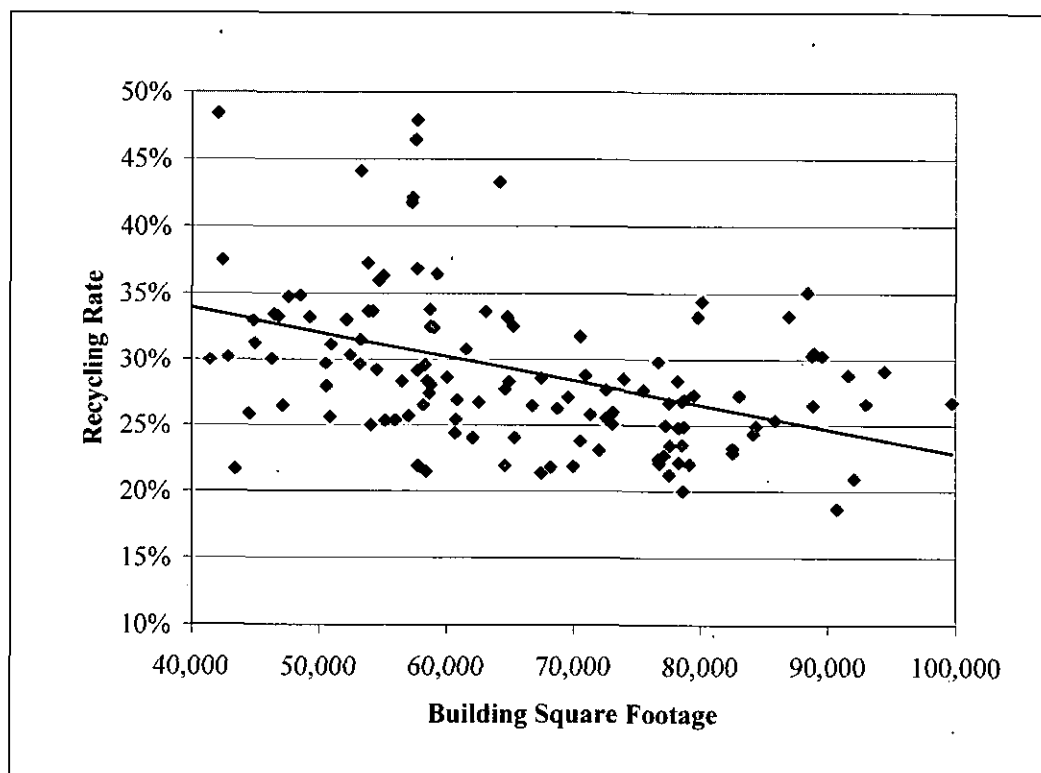
Note that the recycling rates shown in Exhibits 5-1 to 5-3 take into account the increased amount of both recycling and trash generated by schools with larger enrollment levels. In other words, the data show that schools with higher enrollments recycle less on a per capita basis than schools with lower enrollments. A statistical measure of correlation between recycling rate and enrollment appears in Section D of this chapter.

2. Building Size

OLO also compared 2006-2007 school year recycling rates with data on building size. OLO collected MCPS data on the square footage of school buildings and mapped that data according to school recycling rates. As shown in Exhibits 5-4 to 5-6, within each school level, an apparent relationship exists between building size and recycling rates. Schools housed in larger buildings tend to recycle less on a per capita basis than schools housed in smaller buildings.

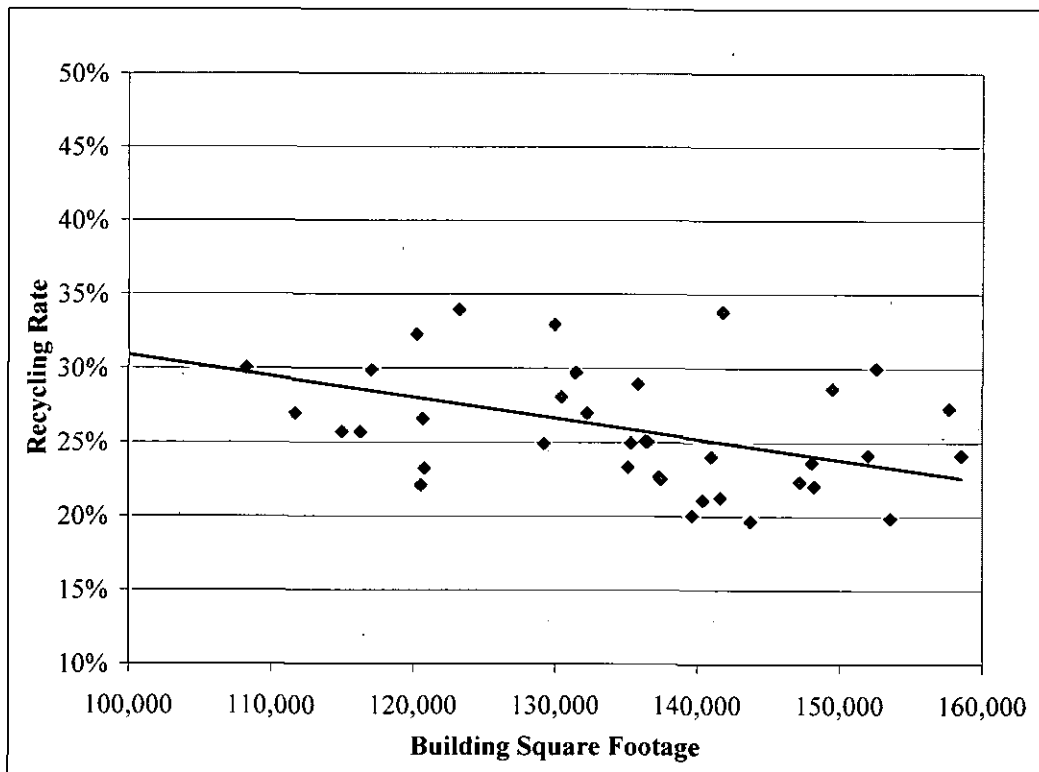
MCPS allocates building service workers to schools based on the square footage of the building. An elementary school receives one building service worker per 17,000 square feet of building space; a middle school receives one worker per 18,000 square feet; and a high school receives one worker per 19,000 square feet. This proportionality of building service workers to building size helps maintain a somewhat even workload for staff (including the collection and handling of recyclables) among MCPS schools.

Exhibit 5-4: Elementary School Building Sizes and Recycling Rates, 2006-2007 School Year



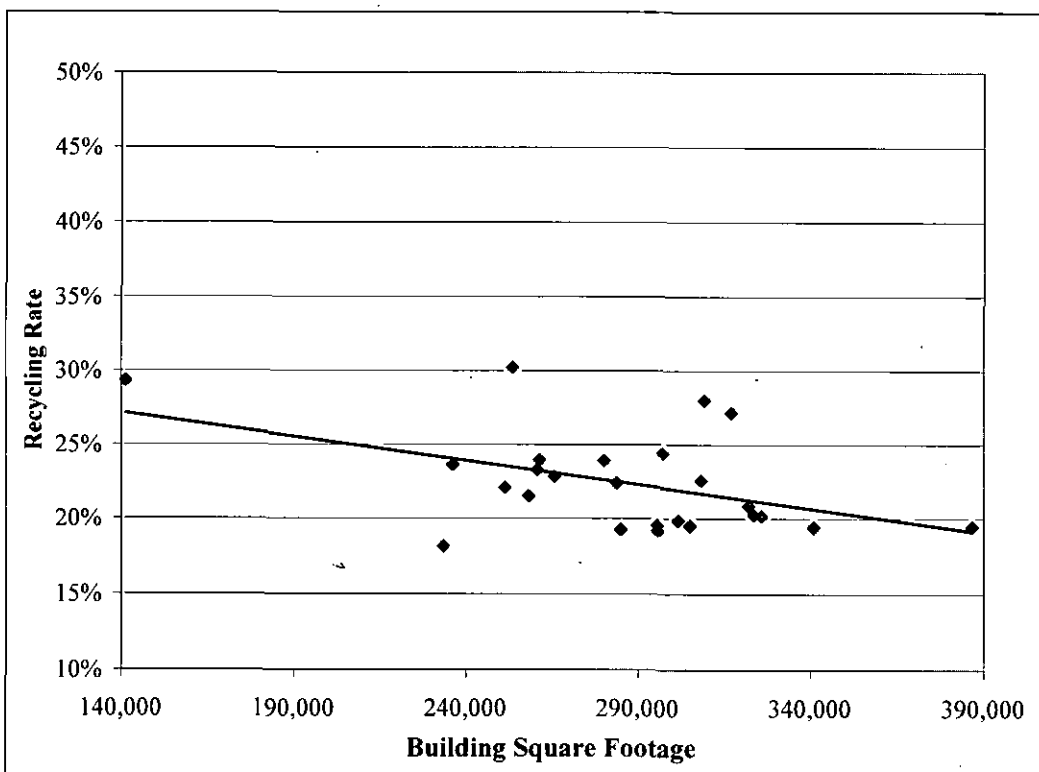
Source: MCPS, OLO

Exhibit 5-5: Middle School Building Sizes and Recycling Rates, 2006-2007 School Year



Source: MCPS, OLO

Exhibit 5-6: High School Building Sizes and Recycling Rates, 2006-2007 School Year



Source: MCPS, OLO

A statistical measure of correlation between recycling rate and building size appears in Section D of this chapter.

Notwithstanding the general correlation between school size (measured both by enrollment and square footage) and recycling rates, Exhibits 5-4 to 5-6 display some significant variation in recycling performance among schools of similar sizes. OLO sought to identify those factors that affect a school's recycling performance even when controlling for school size. The remainder of this chapter presents OLO's analysis of other school characteristics and their relationship to recycling performance.

C. Quantifiable School Characteristics Not Correlated to Recycling Rate

This section presents data for three quantifiable school characteristics examined by OLO that show no apparent relationship to recycling performance.

1. Building Age

OLO compared 2006-2007 school year recycling rates against the ages of MCPS school buildings. In this analysis, OLO measured the age of a building both from its original construction completion and from the date of last major renovation. Under both definitions of school age, OLO found no apparent correlation between school age and recycling performance.

A statistical measure of correlation between recycling rate and building age (from original construction completion) appears in Section D of this chapter.

2. Portable Classrooms

OLO examined the relationship between school recycling rates and the presence of portable classrooms. School building services workers must leave the main building to collect trash and recyclables from portable classrooms. OLO found that the presence of portable classrooms did not have a meaningful effect on the schools' recycling rate.

Portable classrooms are most commonly found in MCPS elementary schools. For 26 MCPS elementary schools, portable classrooms comprised ten percent or more of total facility square footage in the 2006-2007 school year. These 26 elementary schools had an average recycling rate of 29.3%, the exact average recycling rate for the remaining 103 elementary schools.

3. Student Demographics

OLO tested for a relationship between three demographic measures and a school's 2006-2007 recycling rate. For each public school in the County, OLO compared the school's recycling rate with MCPS data on:

- Percentage of students receiving free and reduced meals (FARMS), a measure of household income;
- Percentage of students with limited English language proficiency; and,
- Rate of student mobility (new enrollment and withdrawals).

None of these demographic factors appear to have a connection to school recycling performance. The data indicate family income, English proficiency, and student mobility have no apparent relationship with school recycling rates. Statistical measures of correlation between recycling rate and student demographics appears in Section D.

D. Statistical Analysis of Correlation

The term, "correlation coefficient," refers to a commonly used statistical measure that identifies the strength of relationship between variables. In other words, a correlation coefficient describes the degree to which one data set is associated with another data set.

A correlation coefficient calculation produces a number ranging from -1.0 to 1.0. A correlation coefficient of -1.0 represents a perfect negative (or inverse) correlation between two variables. A correlation coefficient of 1.0 represents a perfect positive correlation between two variables. A correlation coefficient of zero implies no association, or complete independence of the two variables. Table 5-2 shows the correlation coefficients resulting from the comparison of school recycling rates with quantifiable school characteristics described earlier in this chapter.

Table 5-2: Recycling Rate Correlation Coefficients

Relationship with Recycling Rate	School Characteristic	School Level		
		Elementary	Middle	High
Apparent inverse correlation	School enrollment	-.770	-.635	-.789
	Building size	-.428	-.497	-.451
No apparent correlation	Building age	.014	.131	-.430
	FARMS rate	.107	.443	-.034
	Limited English proficiency rate	.007	.171	-.165
	Student mobility rate	.001	.391	.255

Table 5-2 shows a high inverse correlation between a school's 2006-2007 recycling rate and its enrollment level. In other words, schools with fewer students tend to have higher recycling rates than schools with more students. A similar, albeit weaker, correlation exists between recycling rates and building size.

All the other factors tested – building age, FARMS rate, limited English proficiency rate, and student mobility rate – demonstrated very low statistical correlation, or very weak relationship, to recycling performance. Moreover, the correlation coefficients for three factors (building age, FARMS rate, and limited English proficiency rate) demonstrated conflicting relationships by school level with a positive coefficient for elementary and middle schools, but a negative coefficient for high schools.

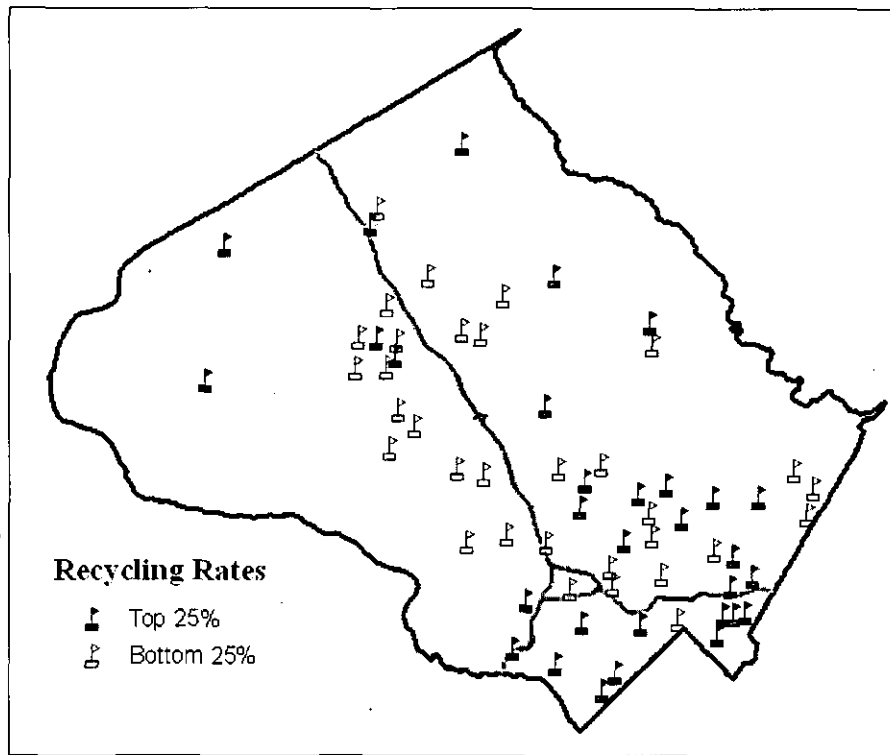
E. Geographic Distribution of Schools by Recycling Rate

OLO also looked at whether the location of a school influences school recycling rates. To do this, OLO ordered the elementary, middle and high schools by recycling rate, identified those in the top and bottom quartile, and mapped the geographic locations of these schools.

Exhibits 5-7 to 5-9 show maps of the schools ranked in the top and bottom 25% (quartile) of recycling for each school level. The maps illustrate that schools with the highest and lowest recycling rates are scattered geographically throughout the County.

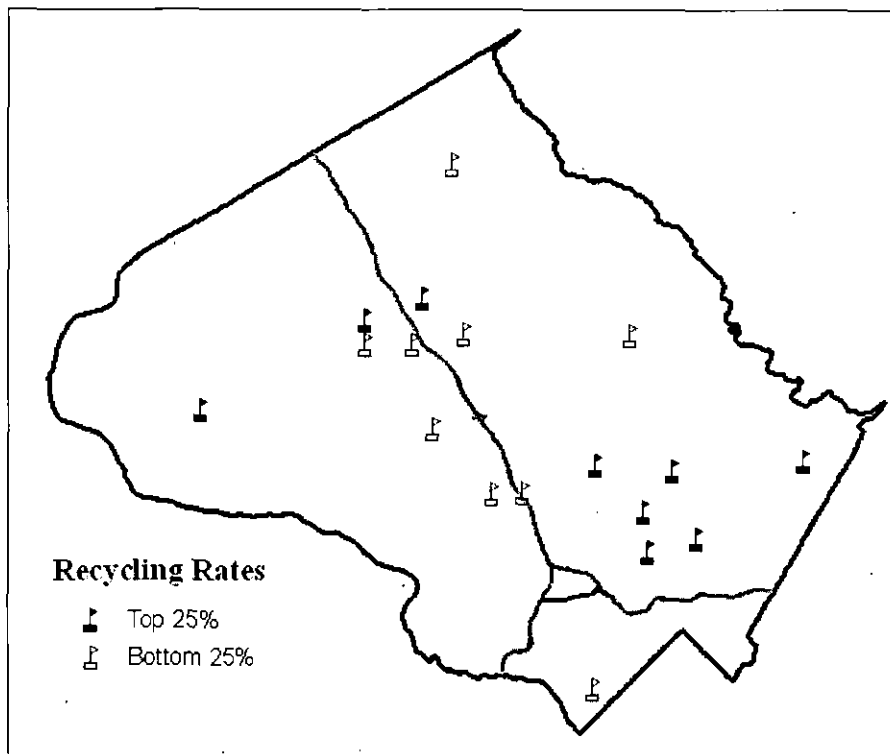
While some clustering of schools is discernable, there is no apparent relationship between geography and recycling rates. For example, five of the eight middle schools with the highest recycling rates are clustered in the Wheaton/Aspen Hill area. However, that area of the County also includes several elementary schools in the lowest recycling rate quartile. In general, most areas of the County include some schools with high recycling rates and other schools with low recycling rates.

Exhibit 5-7: Elementary Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year



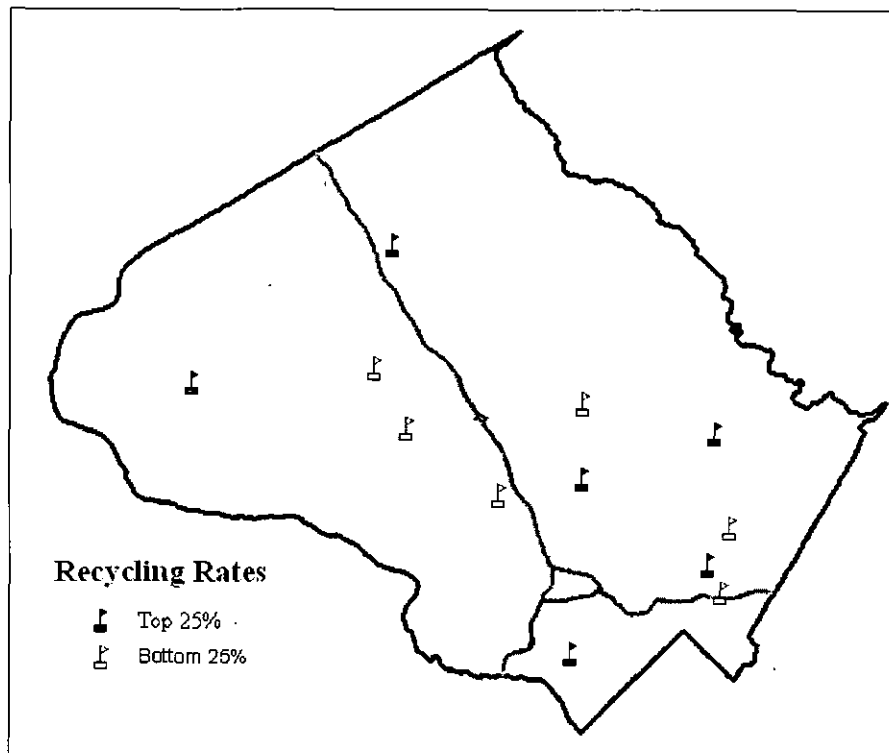
Source: MCPS

Exhibit 5-8: Middle Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year



Source: MCPS

Exhibit 5-9: High Schools with Highest/Lowest Recycling Rates, 2006-2007 School Year



Source: MCPS

F. Observed Practices of Schools with High Recycling Rates

As mentioned in the Methodology section of Chapter I, OLO made a series of site visits to observe the recycling programs at MCPS schools. At one level, OLO observed the recycling programs in place in schools share many similar practices. All schools have paper recycling bins in classrooms, copier rooms, offices, libraries, and computer labs. All schools also provide commingled recycling bins in the lunch room and rooms where faculty and staff eat. School loading docks have large containers for recyclables that are emptied regularly by a contract waste hauling company. In short, the basic recycling infrastructure is in place for all schools.

However, as noted in Chapter II, specific recycling practices vary widely among schools. Individual schools have adopted different approaches to the:

- Composition and responsibilities of the recycling team;
- Collection of recyclables from classrooms;
- Location and number of recycling bins; and
- Promotion of the recycling program.

During visits to observe school recycling programs, OLO sought to identify those practices that differentiated schools with higher recycling rates from those with lower recycling rates. OLO found ten recycling program practices that are most commonly associated with high recycling rates:

1. High level of student involvement;
2. Collaboration among school staff;
3. Recycling promotion;
4. Presence of recycling containers in high activity areas;
5. Contamination prevention;
6. Co-location of trash bins and recycling bins;
7. Clearly labeled recycling containers;
8. Frequent emptying of recycling and trash containers;
9. Awareness of past recycling performance; and
10. The “Recycling Champion.”

These ten practices are discussed in detail below.

1. High Level of Student Involvement

OLO observed that schools with higher than average recycling rates have high levels of student involvement. In schools with high recycling rates, a large and well organized group of students engage in a variety of activities in support of the recycling program. Examples include:

- Assuming primary responsibility (under adult supervision) for the collection of recyclable paper from classrooms and other areas of the building;
- Performing regular inspections of recycling stations;
- Reporting misplaced, contaminated, or overflowing containers; and
- Promoting recycling through posters, public address system announcements, assemblies, video skits, and other media.

In at least one middle school and one high school, the student “Green Team” weighed the contents of classroom recycling bins and posted the results in the hallway. In each of these cases, OLO observed a positive correlation between student participation and recycling success.

2. Collaboration among School Staff

Collaboration among school administrators, faculty and building service workers is one of the hallmarks of successful school recycling. OLO observed strong collaboration

between the Recycling Coordinator and the Building Service Manager in schools with higher than average recycling rates. Cooperation between these two positions helps assure that sufficient recycling containers are placed in the appropriate places, that recycling bins do not overflow, and that recyclables are kept separate from the trash.

Other school personnel can play an important role in successful school recycling. The principal or assistant principal can help set the tone to encourage all faculty and students to recycle and to help reinforce the message of the Recycling Coordinator. Teachers set the rules and expectations for in-class conduct and may influence student recycling behavior. Recycling Coordinators frequently communicate with faculty members, reminding them of the importance of recycling, and notifying teachers in classrooms where trash and recyclables are found mixed together. Successful elementary school recycling coordinators also solicit the assistance of lunch room aides to promote recycling.

3. Recycling Promotion

OLO observed that schools with successful recycling programs regularly and aggressively promote recycling to both students and faculty. For example:

- At the end of every lunch period at one observed elementary school, lunch aides announce that it is time for students to collect their recyclables and to place them in the appropriate container.
- Staff at the same elementary school also periodically present recycling demonstrations in the lunch room.
- As mentioned above, students at a middle school and a high school posted classroom recycling rates to promote recycling performance competition among students and faculty.
- The Recycling Coordinator at one high school sends out weekly e-mails to remind faculty and staff about the recycling collection schedule and how to request additional recycling bins.

While most schools engage in some minimal recycling promotion (such as posters and public address announcements), schools with high recycling rates have developed more aggressive promotion efforts that appear to motivate students and staff to recycle.

4. Presence of Recycling Containers in High Activity Areas

OLO observed that while all schools have paper recycling bins in offices and commingled recycling bins in lunch rooms, schools with high recycling rates have placed recycling bins in other recycling “hot spots.” For example, some middle and high schools have placed recycling bins at the front entrance, in hallways, and other gathering spots where students and staff frequently have recyclables to dispose. Some elementary schools that provide breakfast in the classroom have added commingled recycling bins in those rooms. Recycling Coordinators in high schools with high recycling rates identify areas in need of recycling containers and acquire the containers to meet the need.

5. Contamination Prevention

In recycling, the term “contamination” refers to the mixing of recyclables with other materials in the same container. To successfully recycle, materials must be segregated properly and not mixed with trash or unlike recyclables. When contamination levels become too high, entire containers of recyclable materials must be thrown out as trash.

OLO observed that schools with high recycling rates make a concerted effort to prevent contamination. Most importantly, the recycling containers in these schools often have specialized lids to prevent contamination. Bins for paper have a lid with a long, narrow slot that discourages the disposal of bottles, cans, and bulky trash. Similarly, commingled recycling bins have lids with small round openings to prevent contamination. It is not uncommon for schools to have an insufficient supply of recycling container lids. In many schools with high recycling rates, however, faculty members, student groups, or environmental science classes have constructed their own recycling bin lids to combat contamination. In addition, some Building Service Managers will make sure to lock outdoor recycling collection containers to prevent illegal dumping that contaminates the contents.

6. Co-Location of Trash Cans and Recycling Bins

Convenience plays an important role in the success of a recycling program. In a location with no trash can nearby, some people will dispose of trash in a recycling bin thereby contaminating the contents and rendering them unfit for recycling. Conversely, in a location with no recycling bin nearby, some people will dispose of recyclable materials in a trash can instead of recycling them. OLO observed that schools with high recycling rates co-locate trash cans and recycling bins to prevent contamination. When trash and recycling bins are placed side by side, students and staff are more likely to dispose of materials in the appropriate container.

7. Clearly Labeled Recycling Containers

OLO observed that schools with high recycling rates had clearly marked and well-labeled recycling containers. Recycling containers in these schools are distinct in appearance from trash containers. Clearly labeling recycling containers helps prevent the contamination of recyclables with trash.

8. Frequent Emptying of Recycling and Trash Containers

Overflowing recycling and trash containers serve as a deterrent to successful recycling. When a recycling bin is full, students and staff are more likely to dispose recyclables in a trash can. Conversely, when a trash can is overfilled, students and staff are more likely to dispose of trash in a nearby recycling bin resulting in contamination of the recyclables. OLO observed that schools with high recycling rates empty recycling and trash containers frequently to prevent overfilling.

9. Awareness of Past Recycling Performance

OLO observed that Recycling Coordinators at schools with high recycling rates are well aware of past recycling performance. Some schools have made significant improvement in their recycling rates in recent years. In several cases, Recycling Coordinators informed OLO that MCPS data on individual school recycling rates and Division of Solid Waste Services recycling grades were a major motivating factor to improve recycling performance.

10. The Recycling “Champion”

There is one common element to each of the nine practices of successful school recycling described above. Each of the practices listed above most likely came about because of the involvement of a motivated person within the school who went out of his/her way to make sure it happened. **OLO observed that the most significant factor in the success of a school recycling program is the presence of a recycling “champion.”**

The champion may be a faculty member, building service worker, student, administrator, or parent. Whoever assumes this role, the champion is the person in the building who has the energy, enthusiasm, and dedication to influence the school’s culture in favor of recycling. The recycling champion:

- Serves as the “go to” person who engages the students and faculty;
- Finds new and effective means to promote recycling;
- Notices and corrects situations where recycling bins are mislabeled, misplaced, or contaminated; and
- Arranges for the frequent collection of recycling and trash.

Schools with high recycling rates are schools with one or more outspoken and influential recycling champion(s). **This non-quantifiable factor appears to play a much greater role in recycling performance than the quantifiable measures described earlier in this chapter.** Indeed, the influence of the recycling champion may explain the one quantifiable measure correlated with recycling success. As described above, larger schools generally have less recycling success than smaller schools. One possible explanation for this correlation could be the relationship between the size of the audience and the efficacy of the recycling champion. With an increase in the size of a school, the recycling champion may have more of a challenge getting his/her message heard.

CHAPTER VI. RECYCLING IN THE CAFETERIA

This chapter provides an overview of Montgomery County Public Schools (MCPS) food service activities and discusses recycling and waste reduction practices and options in school cafeterias. The chapter also presents case studies of cafeteria recycling and waste reduction initiatives from other school systems.

- Section A, **Recycling in MCPS Cafeterias**, describes the MCPS food service program and summarizes existing waste reduction and recycling practices in MCPS cafeterias;
- Section B, **Cafeteria Recycling and Waste Reduction Options**, identifies four options to increase recycling or reduce waste in school cafeterias. This section also presents case studies from other school systems and discusses their applicability to MCPS.

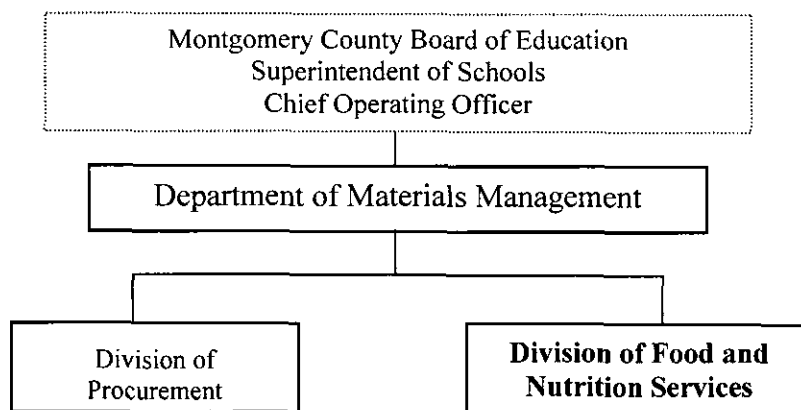
A. Recycling in MCPS Cafeterias

This section describes the MCPS food service program and summarizes existing waste reduction and recycling practices in MCPS cafeterias.

1. Division of Food and Nutrition Services

The Division of Food and Nutrition Services in the MCPS Department of Materials Management is responsible for the planning, purchasing, preparation, production, delivery and service elements of the school meals program. The Division prepares breakfasts, lunches, and after-school snacks centrally at its Central Production Facility on Crabbs Branch Way and delivers the meals to individual schools. In the 2006-2007 school year, MCPS served about 1.8 million breakfasts and 9.4 million lunches to students.

Exhibit 6-1: Department of Materials Management Organization Chart



MCPS provides meals to an average of 55% of elementary students and 24% of secondary students each day. The Division of Food and Nutrition Services prepares and distributes food based on school-by-school food consumption estimates. MCPS meal consumption estimates have proven quite accurate with very minimal unserved food. Depending on the food type, MCPS either disposes or donates unserved food.

2. Composition of Cafeteria Waste

As mentioned in Chapter III, MCPS conducted a waste audit that identified the components of the school waste stream. According to the study, food waste and other cafeteria waste is a significant contributor to the MCPS waste stream. Polystyrene products (such as disposable lunch trays) and coated paper beverage containers (such as milk cartons and juice boxes) also add to the waste stream.

- **Food waste** – Food waste is a significant portion of the MCPS waste stream. In the 2005-2006 school year, solid food waste comprised about 20% and liquid food waste comprised about 6% of the school system's waste. Foil and paper products contaminated by food also add to the waste stream.
- **Polystyrene products** – In the 2005-2006 school year, expanded polystyrene products accounted for about 7% of the MCPS waste stream.
- **Coated paper cartons** – In the 2005-2006 school year, coated paper beverage cartons comprised an estimated 3% of the MCPS waste stream.¹

3. Recycling in School Kitchens and Cafeterias

Every school serves meals. Most school kitchens are designed to receive prepared food from the centralized preparation facility and have no or very limited cooking equipment. School kitchens generate relatively large quantities of recyclable materials, most notably, corrugated cardboard boxes and large metal food cans. Most schools have containers for recyclable cardboard and cans in or near the kitchen.

MCPS school building service workers place commingled containers in the school cafeteria providing students an opportunity to recycle bottles and cans. MCPS has undertaken several other practices to reduce the amount of trash generated by the Division of Food and Nutrition Services and in school cafeterias. These include:

- Donating leftover food to local food banks;
- Using reusable kitchen cloths and aprons;
- Recycling cooking oil and grease; and
- Recycling old equipment and wooden pallets.

¹ Mid Atlantic Solid Waste Consultants, LLC. "Four Season Waste Characterization Study." Montgomery County Public Schools. January 2007.

B. Cafeteria Recycling and Waste Reduction Options

This section identifies options to increase recycling or reduce waste in school cafeterias:

1. Milk Bottle Recycling
2. Food Tray Recycling
3. Reusable Food Trays
4. Food Waste Composting

In addition, this section presents a case study from other school systems for each option and discusses its applicability to MCPS. OLO conducted Internet research on recycling and waste reduction programs in school systems around the country, and made telephone or e-mail contact with program managers to learn more about specific initiatives.

1. Milk Bottle Recycling

MCPS currently serves school milk in coated paper cartons, which are not readily recyclable. An increasing number of dairies around the country are now offering individual serving size milk packaged in recyclable plastic bottles.

The ability of a school system to switch to plastic milk bottles depends on the availability of a local dairy that is equipped to bottle school milk in plastic containers. In addition, an individual serving of milk in a plastic bottle often costs a few cents more per unit than milk in coated paper cartons (see Chapter VII). Case Study #1 describes a program that replaced paper milk cartons with plastic milk bottles in Knox County, Tennessee.

Case Study #1: Recyclable Plastic Milk Bottles

Knox County Public Schools, Tennessee (Enrollment 53,000)

Program Description: At the beginning of the 2006-2007 school year, the Knox County Public Schools (KCPS) replaced non-recyclable coated paper milk cartons with recyclable plastic milk bottles. The KCPS Foodservice Department placed milk bottle recycling barrels in school lunch rooms. A local recycling firm collects the plastic bottles from the schools at no cost to KCPS. As of March 2008, 37 of 76 schools in the KCPS School District have converted to plastic milk bottles.²

Program Outcome: KCPS reports that it recycled two million plastic milk bottles in 2007. KCPS also reports that milk sales increased 8.5% since the conversion to plastic bottles.³

Cost Information: Milk in plastic bottles costs KCPS about five cents more per unit than milk in paper cartons. However, the KCPS Foodservice Director believes that part of this increased cost will be offset by increased sale revenues and volume discounts.

Key Implementation Issue: KCPS was able to implement the conversion from paper to plastic milk containers after a local dairy re-tooled to change its method of packaging milk.

Source: Knox County Public Schools

Applicability to MCPS: MCPS will soon award a new contract for the purchase of school milk. The Division of Food and Nutrition Services has issued the invitation to bid specifying a preference for milk in recyclable plastic containers. This bidding process will determine the cost differential between purchasing milk in paper cartons versus plastic bottles.

Implementation of milk bottle recycling could remove up to 160 tons of waste from the MCPS waste stream. Converting to recyclable plastic milk bottles could reduce MCPS' trash collection and disposal costs. Further information is needed to determine how these cost savings would compare to the costs of purchasing and recycling plastic milk bottles (see Chapter VII).

² Southeast United Dairy Industry Association. "Dairy Promotion News." August 2007.

³ National Dairy Council. "Mealtime." March 2008.

2. Food Tray Recycling

MCPS serves school meals on polystyrene trays. MCPS uses about 5.6 million polystyrene per year. Polystyrene is an inexpensive, rigid plastic that is commonly used in the packaging and food service industries because of its low cost, light weight, retention of heat and cold, and moisture resistance.⁴ However, the manufacturing of polystyrene releases chlorofluorocarbons (CFCs) into the atmosphere.⁵

Food tray recycling would reduce the amount of waste disposed by MCPS. Recycled polystyrene can be made into products such as egg cartons, lunch trays, transport packaging, and office supplies.⁶ However, a polystyrene recycling program depends on the existence and proximity of a reliable acceptance facility.

MCPS had recycled food trays for several years in the late 1980s and early 1990s. MCPS was forced to end the program when all local vendors ceased accepting polystyrene food trays for recycling. During the 1990s, dozens of school systems around the country were forced to abandon their polystyrene recycling programs as vendors either went out of business or shifted to recycling other materials.

Recently, a few school systems in the country have successfully implemented new polystyrene tray recycling programs. Case Study #2 describes a polystyrene food tray recycling program recently implemented in Gwinnett County, Georgia.

⁴ United States Environmental Protection Agency. "Organic Chemical Process Industry: Polystyrene." 1995. http://www.epa.gov/ttn/chiefoff/ap42/ch06/s063/final/c06s063_1995.pdf

⁵ The release of CFCs into the atmosphere contributes to the depletion of the ozone layer and global warming. (US Environmental Protection Agency, <http://www.epa.gov/Ozone/defs.html>)

⁶ American Chemistry Council. "Polystyrene." 2007. http://www.americanchemistry.com/s_plastics/sec_pfpg.asp?CID=1421&DID=5213

Case Study #2: Polystyrene Food Tray Recycling

Gwinnett County Public Schools, Georgia (Enrollment 159,000)

Program Description: The Gwinnett County Public School System (GCPS) began to pilot polystyrene food tray recycling in August 2006. Over 45 schools now participate in the program.⁷ Students stack used trays as they leave the cafeteria. Custodial staff bag the trays and set them out for pick up. GCPS drivers collect the bagged trays and store them underneath the truck during regular meal delivery routes to prevent additional trips. The drivers load the trays onto a centrally located truck for transport to the recycling facility. The commercial recycling plant separates, grinds, and heats the used lunch trays to produce a polystyrene resin. The resin is combined with unrecycled polystyrene material for use in the manufacturing process of new trays or other polystyrene products.⁸ Last year, the National Recycling Coalition recognized the Gwinnett County polystyrene recycling program as the most outstanding K-12 school recycling program in the country.

Program Outcome: GCPS reports that it recycled about 6.3 million lunch trays during the 2006-2007 school year.⁹

Cost Information: GCPS reports that polystyrene food tray recycling generated a net reduction in school system costs.

Key Implementation Issue: The Gwinnett County polystyrene tray school recycling program depends on the existence of an acceptance facility nearby.

Source: Gwinnett County Public Schools

Applicability to MCPS: Food tray recycling could be re-introduced to MCPS with some moderate in-school changes. MCPS would need to acquire new collection containers for school cafeteria and students would need to be trained to segregate the trays from other trash. The central implementation issues would be the potential program costs and the availability of a vendor to accept MCPS food trays. At present, no facility exists in the region to accept polystyrene trays. However, the vendor who accepts trays from Gwinnett County currently is examining the feasibility of opening a similar facility in the Mid-Atlantic region.

⁷ Gwinnett County Public Schools. "GCPS' Lunch Tray Recycling Program nationally recognized." Press Release. December 6, 2007.

⁸ Gwinnett County Public Schools. "Award-winning Recycling Program." 2008.

<http://www.gwinnett.k12.ga.us/gcps-mainweb01.nsf/pages/Award-winningRecyclingProgram?OpenDocument&~QuickLinks>

⁹ Gwinnett County Public Schools. "Communiqué." Fall 2007.

Implementation of food tray recycling could remove up to 80 tons of waste from the MCPS waste stream. Further information is needed to determine how the cost of implementing a tray recycling program would compare to savings achieved by the associated reduction in trash collection requirements (see Chapter VII).

3. Reusable Food Trays

As mentioned above, MCPS serves meals on disposable polystyrene trays. As an alternative to recycling, some school systems use reusable food trays. Reusable trays are collected, washed, and re-used in the school cafeteria. Staff and equipment are needed to wash trays either at schools or at central food service facility.

Reuse of trays reduces that amount of trash generated in schools, and also reduces the amount of fuel used because it eliminates the need to manufacture and ship new trays. However, the washing process may require high levels of water and energy consumption.¹⁰

Case Study #3 describes a pilot program in the Portland (Oregon) Public Schools that replaces polystyrene food trays with reusable trays.

¹⁰ In response to drought conditions in the Southeast, the Clarke County (Georgia) School District recently replaced washable trays with disposable trays as a water conservation measures.

Case Study #3: Reusable Food Trays

Portland Public Schools, Oregon (Enrollment 47,000)
Program Description: Portland Public Schools (PPS) currently is conducting a pilot program that replaces polystyrene trays with reusable, washable hard plastic trays in nine of the system's 76 schools. The school system purchased and distributed over 4,500 trays, to schools that chose to participate. ¹¹ The participating schools rely on parents and other volunteers to wash, dry, and store the trays after the last lunch service of the day. Schools must apply to PPS with a plan for implementing the program, including proof of the required volunteer support and a plan showing how the school will sustain that level of commitment.
Program Outcome: The PPS reusable school tray program is still in a pilot stage and data is not yet available on the amount of waste reduction achieved.
Cost Information: The PPS program received a \$14,000 grant from the Portland area regional government (Metro) for the purchase of the trays. The PPS Nutrition Services Department pays for dishwasher maintenance and supplies.
Key Implementation Issue: The PPS program depends on a steady, reliable supply of volunteers, as well as the presence of dishwashing equipment in the schools. ¹²

Source: Portland Public Schools

Applicability to MCPS: In contrast to the PPS schools, most MCPS schools do not have space on-site to accommodate new tray washing equipment. Similarly, the Central Production Facility does not have equipment to wash tens of thousands of trays per day. In addition, significant truck capacity would be needed to regularly transport dirty and washed trays between a centralized facility and individual schools. For these reasons, the conversion to reusable food trays does not appear to be a viable or affordable option for MCPS.

4. Food Waste Composting

Composting is the controlled biological decomposition of organic materials. Food waste may be composted with other organic materials to create a soil amendment product. Often, food service paper products (such as napkins or cardboard) are compostable along with food waste. Like recycling, composting reduces the amount of material in the waste stream. As mentioned above, food waste is one of the largest unrecycled components of the MCPS waste stream.

¹¹ Portland Public Schools. "Cafeterias go green with reusable trays." February 7, 2008.

¹² Portland Public Schools. "Resources Conservation Newsletter." November 2002.
http://www.pps.k12.or.us/depts-c/fam/cms_health/november02.pdf

Food waste composting requires the separation of food wastes from other trash for disposal in leak-proof storage containers. Containers must be emptied frequently to prevent pest infestation. Food waste may be composted on-site or transported to an off-site acceptance facility. Case Study #4 describes a food waste composting program operated by two school districts in Clark County, Washington.

Case Study #4: Food Waste Composting

Vancouver and Evergreen School Districts, Clark County, Washington (Combined Enrollment 48,000)
Program Description: Two schools districts in Clark County, Washington have implemented a lunchroom food waste composting program known as "Save Organic Scraps." When students in these school districts finish their lunch, they walk down a "recycle line" where students deposit trash into one bin, commingled recyclable material into another bin, and organic material into a third bin. Student volunteers monitor activity at the recycling and compost containers to prevent contamination. Building custodial staff take the food waste roll bins to the compost dumpster. A contractor collects the waste once a week from each school and transports it to a private composting facility located near Seattle. The facility mixes food waste with other organic materials to create a commercially marketed soil amendment product. ¹³
Program Outcome: From 2005 through 2007, the Vancouver and Evergreen School Districts diverted more than 253 tons of food waste for composting. ¹⁴
Cost Information: The Washington State Department of Ecology provided a \$28,000 grant to Clark County for the initial cost the program. Start-up costs are about \$325 per school for equipment. School officials expect the long-term operating impact of the program to be cost neutral with trash disposal savings offsetting the additional costs for purchase of biodegradable compost bin liners and food waste collection and transport. ¹⁵
Key Implementation Issue: The Clark County school food waste composting program depends on the existence of a food waste acceptance facility located in the region.

Source: Clark County, Washington

Applicability to MCPS: While food waste composting, in theory, could reduce MCPS trash generation by around 20%, in the near term, this option does not appear to be a viable or affordable option. MCPS would have no place to send food waste even if it was segregated in cafeterias, as no food waste acceptance facilities currently exist in the region.

¹³ Clark County. "Save Organic Scraps." 2008. <http://www.clark.wa.gov/recycle/school/sos.html>

¹⁴ Clark County Solid Waste Department. "Students, Save Organic Scraps!" 2007. <http://www.clark.wa.gov/recycle/documents/SOS/SOS%20Program.pdf>

¹⁵ DuBois, Peter and Penny Ramey. "Practical Model for School Organics Recovery." *BioCycle*. Vol. 47, No. 2. February 2006.

CHAPTER VII. POTENTIAL TO INCREASE MCPS RECYCLING

This chapter describes the extent to which MCPS may increase its recycling performance and the costs and savings that would result from increased recycling. Specifically:

- Section A, **Recycling Potential**, presents data on potential increases in MCPS recycling performance; and
- Section B, **Potential Costs and Savings from Increased Recycling**, discusses the potential costs and saving associated with efforts to increase MCPS recycling.

A. Recycling Potential

This section presents data on potential increases in MCPS recycling performance. As stated in Chapter III, MCPS conducted a study during the 2005-2006 school year that identified the composition of waste disposed in MCPS schools. The waste composition study calculated the percentage of different materials, including recyclables, in school trash. The study showed that over 23% of the trash disposed at schools consists of recyclable materials. Recyclable paper products make up 16% of MCPS' trash while commingled containers¹ make up an additional 5% of the trash.

1. Maximum Paper and Commingled Recycling

Despite the presence of large quantities of recyclables in the trash, the MCPS recycling program has successfully captured² significant amounts of paper and commingled containers for recycling. In the 2006-2007 school year, MCPS recycled about 57% of recyclable paper and about 42% of commingled containers. Table 7-1 shows OLO's estimates of the amount of recyclable paper and commingled containers generated, recycled, and trashed by MCPS during the 2006-2007 school year.³

Table 7-1: Estimated Paper and Commingled Tonnages and Recycling Rates, 2006-2007 School Year

	Recyclable Paper	Commingled Containers
Tons Generated	4,570	940
Tons Recycled	2,600	390
Tons Trashed	1,970	550
Recycling Rate	57%	42%

Sources: OLO; MCPS; MSW Consultants, 2007

¹ Commingled includes aluminum cans, glass bottles, narrow-neck plastic bottles, and ferrous cans.

² The term "capture" refers to the percent of potentially recyclable materials actually set aside for recycling.

³ OLO calculated the recycling rates using actual 2006-2007 MCPS trash and recycling tonnages and data from the 2005-2006 waste composition study. Chapter III describes the methodology for calculating the data in Table 7-1.

As discussed in Chapters II and V, MCPS has installed the core infrastructure needed to recycle paper products and commingled containers in each school. Nonetheless, nearly 2,000 tons of recyclable paper and over 500 tons of commingled containers were disposed as trash by MCPS last school year (see Table 7-2).

This quantity of recyclable materials disposed represents the maximum potential increase in recycling that could be achieved by MCPS through its existing recycling program. In other words, if every school recycled 100% of its paper and commingled containers, MCPS would have diverted an additional 2,500 tons from the trash to the recycling stream.

Table 7-2 shows that amount of additional tons that MCPS would have recycled in the 2006-2007 school year had it recycled 100% of all recyclable paper and containers. Table 7-2 also shows that a paper recycling rate of 100% would have raised the school system's overall recycling rate by nearly 12%, while recycling 100% of commingled containers would have raised the rate by more than 3%.

Table 7-2: Effect of 100% Capture of Recyclable Paper and Commingled Containers on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate

	Recyclable Paper	Commingled Containers	Totals
Additional Tons of Recycled Materials	1,970	550	2,520
Percent Addition to MCPS' Overall Recycling Rate	11.9%	3.3%	15.2%

Sources: OLO; MCPS; MSW Consultants, 2007

2. Attainable Paper and Commingled Recycling

In practice, a 100% recycling rate for any material is extremely difficult to achieve. The most successful recycling programs cannot claim that not a single piece of paper, cardboard box, aluminum can, nor plastic bottle was improperly disposed in the trash. OLO suggests that a more realistic and attainable goal for an environment such as a school would be to recycle 80% of paper and commingled containers. An 80% capture rate for paper and commingled containers equates to an average of about 63 pounds recycled per student per year, a level achieved in 18 schools during the 2006-2007 school year.

Table 7-3 on the following page shows that amount of additional tons that MCPS would have recycled in the 2006-2007 school year if it recycled 80% of all recyclable paper and containers. Table 7-3 also shows that a paper recycling rate of 80% would have raised the school system's overall recycling rate by more than 6% (1,050 tons), while recycling 80% of commingled containers would have raised the rate by more than 2% (360 tons).

Table 7-3: Effect of 80% Capture of Recyclable Paper and Commingled Containers on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate

	Recyclable Paper	Commingled Containers	Totals
Additional Tons of Recycled Materials	1,050	360	1,410
Percent Addition to MCPS' Overall Recycling Rate	6.4%	2.2%	8.6%

Sources: OLO; MCPS; MSW Consultants, 2007

3. Possible Plastic Milk Bottle and Food Tray Recycling

As detailed in Chapter VI, an opportunity may exist to implement two new recycling programs in MCPS cafeterias. Recycling milk containers and food trays has the potential to reduce the amount of trash generated in MCPS schools. As OLO concluded in Chapter VI, two other cafeteria waste management initiatives – food waste composting and employing reusable food trays – currently do not appear to be viable options for MCPS.

Currently, MCPS sells milk in non-recyclable coated paper cartons. Table 7-4 shows the amount and weight of milk cartons disposed in the trash by MCPS in a year.

Table 7-4: Weight of Milk Cartons Disposed by MCPS as Trash per Year

Number of milk cartons sold by MCPS	10,200,000
Weight of each carton (oz.)	0.5
Tons of milk cartons disposed as trash	159.4

Source: MCPS

MCPS also serves meals on disposable polystyrene trays. MCPS purchases three types of food trays: small, large, and hinged. Table 7-5 shows the amount and weight of polystyrene food trays disposed in the trash by MCPS in a year.

Table 7-5: Weight of Polystyrene Food Trays Disposed by MCPS as Trash per Year

	Small	Large	Hinged	Total
Number of food trays used by MCPS	1,000,000	4,625,000	7,500	5,632,500
Weight of each tray (oz.)	0.25	0.5	0.33	---
Tons of polystyrene disposed as trash	7.8	72.3	0.1	80.2

Source: MCPS

Tables 7-4 and 7-5 show a switch to recyclable plastic milk containers and the introduction of a food tray recycling program could reduce MCPS trash generation by a maximum of 240 tons; however, as mentioned above, 100% recycling of any material is a difficult goal to achieve. Table 7-6 shows the results assuming a recycling rate of 80% for plastic milk bottles and food trays. If MCPS achieved this more attainable rate, it would raise MCPS' annual recycling totals by a combined 172 tons.

Table 7-6: Effect of 80% Capture of Recyclable Milk Bottles and Food Trays on MCPS 2006-2007 Recycling Tons and Overall Recycling Rate

	Milk Bottles	Food Trays	Totals
Additional Tons of Recycled Materials	128	64	172
Percent Addition to MCPS' Overall Recycling Rate	0.8%	0.4%	1.2%

Sources: OLO; MCPS; MSW Consultants, 2007

4. Summary – Attainable MCPS Recycling Growth

As presented in Chapter III, MCPS achieved an overall system recycling rate of about 27% for the 2006-2007 school year. If MCPS achieved an 80% capture rate for paper, commingled containers, milk containers, and food trays, this would raise the overall MCPS recycling rate to 37% (based on 2006-2007 waste generation data).

As shown in Table 7-7, nearly all of the growth in MCPS recycling could be attained by maximizing the capture of materials that are currently part of the school recycling program. In fact, the potential yield for paper and commingled containers combined is more than seven times greater than the potential yield of starting new milk container and food tray recycling programs.

Table 7-7: Effect of Potential Increase in MCPS Recycling Rate by Material Type

Recyclable Material		Additional Tons Recycled*	Addition to Overall MCPS Recycling Rate
Currently Recycled	Recyclable Paper	1,050	6.4%
	Commingled Containers	360	2.2%
Potentially Recyclable	Milk Cartons	128	0.8%
	Food Trays	64	0.4%
Total		1,602	9.8%

Sources: OLO; MCPS; MSW Consultants, 2007

* based on an assumed 80% capture rate for each material

B. Potential Costs and Savings from Increased Recycling

This section discusses the potential costs and savings associated with efforts to increase the MCPS recycling rate. As detailed below, more information is needed to determine how the costs of increasing MCPS recycling would compare with savings achieved by that change. In addition, potential new costs and savings may fall in different (and possibly non-transferable) portions of the MCPS budget. For example, the Division of Maintenance may experience trash collection savings as a result of purchasing decisions that may raise costs for the Division of Food and Nutrition Services (which operates as an enterprise fund).

1. Potential Costs

As detailed below, raising the overall MCPS recycling rate may require additional costs.

Increasing Capture of Current Recyclables: While the basic system-wide infrastructure is in place for paper and commingled recyclables, MCPS data show a great variation in school-by-school recycling performance. To raise the overall MCPS recycling rate, additional resources may be needed to assist in-school personnel raise the capture rate of paper and commingled containers in their schools. To raise school recycling rates, MCPS may need to increase staff training, fund additional promotional efforts, purchase additional recycling containers, and/or provide incentives for recycling performance.

Converting to Recyclable Plastic Milk Bottles: As a rule, schools that convert from paper milk cartons to plastic milk bottles experience a cost increase of a few pennies per unit. As MCPS sells more than 10 million milk containers a year, a two- to four-cent per unit cost increase would raise expenditures by \$200,000 to \$400,000 per year. MCPS has issued a new invitation to bid for the purchase of school milk. The bid specifies a preference for milk in recyclable plastic containers. This bidding process will determine the actual cost differential between milk in paper cartons versus plastic bottles.

Food Tray Recycling: Implementation of a food tray recycling program would require execution of a collection contract as well as purchase of new in-school food tray recycling bins. MCPS will need to enter into discussions with a potential food tray recycler to estimate the extent of these costs.

2. Potential Savings

Increasing the MCPS recycling rate could produce reductions in trash collection workload, tip fee payments, and recycling contract costs.

Trash Collection Workload Reduction: MCPS hauls trash from school system facilities for disposal at the County's Transfer Station. MCPS operates trash collection vehicles from four depots: Bethesda, Clarksburg, Randolph, and Shady Grove. Schools receive trash collection at least every other weekday. Two-person crews from each depot travel one of two trash collection routes each day. In total, the crews from each of the four depots typically make ten trash collection runs a week.

Waste disposal records from the County's Solid Waste Transfer Station indicate a pattern in MCPS trash collection. Nearly every day, MCPS trash trucks fill up before the completion of the day's assigned routes. On most days, the crew must interrupt the route to empty the trash at the Transfer Station and then return to collect trash from the remaining facilities on the route.

MCPS trash trucks have a capacity of holding about 7.5 to 8.0 tons of trash. Each MCPS trash crew is responsible for collecting trash from facilities that generate about 11 tons of trash per day. As a result, the second daily MCPS trash run frequently collected less than half the tonnage of the first run of the day.

If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce average daily trash collection by about 2.0 tons per day. Implementing milk bottle recycling and food tray recycling at an 80% capture rate would reduce average trash generation by about 0.3 tons per day.

A reduction in the amount of trash generated by schools could allow for a reduction in the number of routes runs per week. The data suggest that by achieving 80% capture of paper and commingled containers, MCPS could continue to provide trash collection at current frequencies by running only eight (instead of ten) runs per depot per week.⁴ Assuming that the second daily run takes an average of 2.5 hours, the reduction of two runs per depot per week would save about 40 person hours of work time per week. These hours could be assigned to perform truck maintenance and other needed functions. The reduction of truck trips would also lower MCPS fuel and vehicle maintenance costs.

Reduced Tip Fee Costs: MCPS pays a "tip fee" to dispose of trash at the County's Transfer Station. The current tip fee is \$56.00 per ton. If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce its annual tip fee payments by about \$80,000. Implementing milk bottle recycling and food tray recycling at an 80% capture rate would yield an additional \$10,000 in annual tip fee reductions.

⁴ To achieve this outcome, MCPS likely would need to adjust its trash collection routes by moving some facilities from the second day to the first day in the alternating day collection schedule.

Potential Revenue from Sale of Recyclables: Under the terms of the current recycling hauling contract, MCPS pays a fee for collection of paper and commingled containers based on the number of schools served and the frequency of the collection from each school. The current contract costs MCPS about \$600,000 per year. The contract does not include a payment differential based on the quantity of recyclables collected nor does it offer a reduction in payment for revenues received from the sale of recyclables.

MCPS intends to re-bid the contract by the end of the current Calendar Year. Some generators of recyclables enter into collection contracts that include sharing of revenues obtained through the sale of recyclable materials. In contracts of this sort, the revenue secured from the sale of recyclables offset a portion of the collection costs.

Depending on market conditions, paper, aluminum, and plastic often return prices of several hundred dollars per ton when sold for recycling. If the new recycling contract includes a revenue sharing provision, MCPS could achieve significant savings by increasing the amount of paper and commingled containers sent for recycling. The magnitude of these cost savings could well exceed \$150,000⁵ depending on the terms of the revenue sharing provision and future recycling market conditions. OLO cautions that the feasibility and terms of a revenue sharing contract cannot be known until MCPS issues a solicitation for a new recycling contract.

⁵ For example, an increase of 1,400 tons of paper and commingled containers could reduce contract costs by \$175,000 assuming an average sales price of \$250 per ton and a 50% revenue share.

CHAPTER VIII: FINDINGS

This chapter summarizes the Office of Legislative Oversight's (OLO) findings on the Montgomery County Public Schools' recycling practices. OLO presents 21 findings in the following subject areas:

- MCPS' Recycling Program;
- School and System Recycling Rates;
- Relationship between School Characteristics and Recycling Rate;
- Practices Most Associated with Successful School Recycling;
- Recycling in the School Cafeteria;
- Potential for Growth in MCPS Recycling; and
- Potential Costs and Savings from Increasing the MCPS Recycling Rate

MCPS' RECYCLING PROGRAM

Finding #1: Basic recycling infrastructure exists in all MCPS schools.

MCPS students and faculty have the opportunity to recycle paper and commingled containers (bottles and cans) in school. Specifically, all MCPS schools have:

- Paper recycling bins located in classrooms, copier rooms, offices, libraries, and computer labs;
- Commingled container recycling bins in the lunch room, and rooms where faculty and staff eat;
- Large containers for recyclables placed on their loading docks that are emptied regularly by a contract waste hauling company.

In addition, MCPS requires each school to designate a Recycling Coordinator and a recycling team.

Finding #2: Recycling practices vary widely among schools.

While all MCPS schools have similar recycling infrastructure, variations exist in how schools implement their respective recycling programs. Schools have adopted different approaches to the:

- Collection of recyclables from classrooms;
- Location and number of recycling bins; and
- Promotion of the recycling program.

The responsibilities and activities of the Recycling Coordinator vary from school to school. Some Recycling Coordinators merely serve as the designated recycling contact person in the school while others actively oversee recycling collection and promotion activities.

In addition, the composition of school recycling teams varies from school to school. Some recycling teams consist of only the Building Service Manager whereas others may include teachers, parents, and/or students in environmental science classes, special education classes, the National Honors Society, or an environmental club.

SCHOOL AND SYSTEM RECYCLING RATES

Finding #3: MCPS achieved an overall recycling rate of 27% in the 2006-2007 school year.

The 27% of MCPS' waste stream that is recycled consists primarily of paper, commingled containers, yard trim, and scrap metal. The remaining 73% of MCPS' waste stream that is not recycled includes food waste, non-recyclable paper and plastics as well as recyclable paper and containers that were disposed as trash.

Finding #4: MCPS recycled 57% of recyclable paper and 42% of commingled containers during the last school year.

The table below lists the 2006-2007 school year recycling rates for materials currently included in the MCPS recycling program. The data show that MCPS' recycling program captured significant amounts of paper, yard trim, commingled containers, and scrap metal. (The term "capture" refers to the percent of potentially recyclable materials actually set aside for recycling.)

MCPS Recycling Rates by Material Types, 2006-2007 School Year

Material Type	Recycling Rate
All Materials	27%
Recyclable Paper	57%
Commingled Containers	42%
Yard Trim	57%
Scrap Metal	50%

Source: MSW Consultants; MCPS; OLO

However, significant quantities of MCPS recyclables are also disposed in the trash. Last year, MCPS schools trashed about 2,000 tons of recyclable paper and 500 tons of commingled containers.

Finding #5: Elementary schools have the highest median recycling rate; high schools have the lowest median recycling rate.

At 28%, elementary schools have the highest median recycling rate. For middle schools and high schools, the comparable rates are 25 % and 22%, respectively.

On average, elementary schools recycle much more paper than middle or high schools. For elementary schools, the median amount of paper recycled per student last year was about 40 pounds, compared to 31 pounds per middle school student and 23 pounds per high school student.

On average, high schools recycle much more commingled containers than middle or elementary schools. For high schools, the median amount of commingled containers recycled per student last year was 2.5 pounds, compared to 2.0 pounds per middle school student and 1.3 pound per elementary school student.

Finding #6: Paper recycling is the dominant contributor to school recycling.

Paper products account for approximately three-quarters (measured by weight) of all school recycling. Elementary schools recycle 31 times more paper than commingled containers. Although high schools have relatively low paper and relatively high commingled container recycling rates, paper still dominates the recycling calculation, contributing nine times more weight than commingled containers.

Finding #7: Wide variations in recycling rates exist within each school level.

The recycling rates that individual schools achieve vary widely. During the 2006-2007 school year, the recycling rates for:

- The 129 elementary schools ranged from 19% to 61%;
- The 38 middle schools ranged from a 20% to 38%; and
- The 25 high schools ranged from 18% to 30%.

RELATIONSHIP BETWEEN SCHOOL CHARACTERISTICS AND RECYCLING RATE

Finding #8: An inverse relationship exists between MCPS recycling rates and school size.

OLO used quantitative tests to determine whether certain characteristics such as school enrollment or building size influence a school's recycling rate. OLO found an inverse correlation between recycling performance and school size (measured by enrollment and building size). In other words, smaller schools tend to have higher recycling rates whereas larger schools tend to have lower rates. This pattern exists at all three school levels, i.e., elementary, middle and high school.

Finding #9: MCPS recycling data indicate no apparent relationship exists between recycling performance and building age, the presence of portable classrooms, or student demographics.

OLO's analysis of MCPS recycling data found no apparent relationship between recycling performance and other quantifiable school characteristics tested, including:

- Building age;
- The presence of portable classrooms;
- The free and reduced meals (FARMS) rate;
- The limited English proficiency rate; and
- The student mobility rate.

Each of these measures demonstrated a very low statistical correlation, or a very weak relationship, to recycling performance.

Finding #10: Geography does not appear to be a factor that influences school recycling rates.

To determine whether geography influences school recycling rates, OLO mapped the locations of the elementary, middle, and high schools that recorded the highest and lowest recycling rates. OLO found no apparent relationship between the location of the school in the County and recycling performance.

PRACTICES MOST ASSOCIATED WITH SUCCESSFUL SCHOOL RECYCLING

Finding #11: OLO identified practices associated with relatively high recycling rates.

In observing the recycling programs in schools, OLO identified the practices that differentiate schools with higher recycling rates from those with lower rates. Each of the practices listed below occurred because a motivated person within the school went out of his/her way to assure that it happened (see next finding).

1. High level of student involvement – In schools with high recycling rates, a large and well organized group of students engage in a variety of activities that support the recycling program.
2. Collaboration among school staff – Collaboration among school administrators, faculty and building service workers to recycle is one of the hallmarks of successful school recycling.
3. Recycling promotion – While most schools engage in some minimal recycling promotion, schools with higher recycling rates have developed more visible promotional efforts that appear to motivate students and staff to recycle.
4. Presence of recycling containers in high activity areas – While all schools have paper recycling bins and containers in offices, and commingled recycling bins in lunch rooms, schools with higher recycling rates have placed recycling bins in other recycling “hot spots.”
5. Contamination prevention – Schools with higher recycling rates make a concerted effort to prevent contamination. Most notably, the recycling containers in these schools often have specialized lids to prevent contamination.
6. Co-location of trash cans and recycling bins – Schools with higher recycling rates co-locate trash cans and recycling bins to prevent contamination.
7. Clearly labeled recycling containers – Schools with higher recycling rates had clearly marked and well-labeled recycling containers.
8. Frequent emptying of recycling and trash containers – Overflowing recycling and trash containers serve as a deterrent to successful recycling. Schools with higher recycling rates empty recycling and trash containers frequently to prevent overfilling.
9. Awareness of past recycling performance – Recycling Coordinators at schools with higher recycling rates are well aware of their individual school’s record of recycling.

Finding #12: The most significant factor in a school's recycling success appears to be the presence of a recycling "champion."

Schools with higher recycling rates have at least one motivated individual who enthusiastically promotes a recycling culture and takes responsibility for the success of the program. OLO found that the presence of an outspoken and influential recycling "champion" appears to be essential to the success of a school recycling program. OLO adopts the term "champion" to mean any faculty member, building service worker, student, administrator, or parent in a specific school who:

- Serves as the "go to" person for recycling issues and questions;
- Finds new and effective ways to promote recycling;
- Notices and corrects problems with the recycling infrastructure, e.g., mislabeled, misplaced, or contaminated recycling bins; and
- Arranges for the frequent collection of recycling and trash.

OLO observed that these individuals bring energy, enthusiasm, and dedication to the recycling program and influence the school's culture in favor of recycling.

RECYCLING IN THE SCHOOL CAFETERIA

Finding #13: An opportunity exists for MCPS to convert from non-recyclable milk cartons to recyclable plastic milk bottles.

MCPS currently serves school milk in coated paper cartons, which are not readily recyclable. An increasing number of dairies around the country now offer individual serving size milk packaged in recyclable plastic bottles. Based on sales data provided by MCPS, OLO estimates that the purchase and recycling of plastic milk bottles could remove up to 160 tons of waste from MCPS' trash each year.

MCPS will soon award a new contract for the purchase of school milk. The Division of Food and Nutrition Services has issued the invitation to bid specifying a preference for milk in recyclable plastic containers. This bidding process will determine the cost differential between purchasing milk in paper cartons versus plastic bottles. Upon receiving responses to the invitation to bid, MCPS will be able to assess the feasibility of converting to recyclable plastic milk bottles.

Finding #14: Several school systems across the country recently started programs to recycle school food trays.

MCPS serves school meals on polystyrene trays. MCPS uses about 5.6 million polystyrene food serving trays per year. Based on data provided by MCPS, OLO estimates that food tray recycling could remove up to 80 tons of waste per year from the trash.

MCPS recycled food trays for several years in the late 1980s and early 1990s. MCPS was forced to abandon the food tray recycling when all local vendors either went out of business or shifted to recycling other materials. Recently, a few school systems in the country have successfully implemented new polystyrene tray recycling programs.

At present, no facility exists in the region to accept polystyrene trays. However, the vendor who accepts trays from the Gwinnett County Public Schools (Georgia) currently is examining the feasibility of opening a facility in the Mid-Atlantic region. Further information and analysis is needed to calculate whether the implementation costs of a tray recycling program in Montgomery County would be offset by the savings realized from the reduction in trash collection costs.

Finding #15: Converting to reusable food trays does not appear to be either viable or affordable for MCPS.

Converting from disposable to reusable food trays would be costly and operationally difficult for a number of reasons, including:

- Most MCPS school buildings do not have sufficient space to accommodate food tray washing equipment;
- The MCPS Central Production Facility does not have equipment to wash tens of thousands of trays per day; and
- Significant truck capacity would be needed to regularly transport dirty and washed trays between a centralized facility and individual schools.

Finding #16: Food waste composting currently does not appear to be either viable or affordable for MCPS.

Food waste accounts for about one-quarter of the trash disposed at MCPS schools. Food waste may be composted with other organic materials to create a soil amendment product. In the near term, however, food waste composting does not appear to be a viable option for MCPS. The major reason is that no food waste acceptance facilities currently exists in the region; MCPS would have no place to send food waste even if it was segregated in cafeterias.

POTENTIAL FOR GROWTH IN MCPS RECYCLING

Finding #17: The MCPS schools with the highest recycling rates capture at least 80% of their recyclable paper and commingled containers. Matching this performance in all schools would raise the overall MCPS recycling rate from 27% to 36%.

During the 2006-2007 school year, 18 individual MCPS schools recycled an amount of paper and commingled containers (by weight) consistent with an 80% capture rate.

If the remaining 174 schools had achieved 80% capture of these materials, the overall MCPS recycling rate would have increased from 27% to 36%, with paper contributing three-quarters of this growth. Across all schools, this level of recycling achievement would have diverted an additional 1,400 tons of trash to the recycling stream.

Finding #18: Implementing milk bottle and food tray recycling would increase the overall MCPS recycling rate by about one percent combined.

Milk containers and food trays combined comprise about 1.5% of the MCPS waste stream. A switch to recyclable plastic milk bottles and the introduction of a food tray recycling program would reduce MCPS trash generation. Based on data from the 2006-2007 school year, achieving an 80% recycling rate of both milk bottles and food trays would only increase the overall MCPS recycling rate by about 1.2%.

Finding #19: The greatest potential growth in MCPS' recycling would be attained through maximizing the capture of materials already recycled in schools.

Given the composition of MCPS waste stream and current recycling markets, the potential yield for paper and commingled containers combined is more than seven times greater than the potential yield of starting new milk container and food tray recycling programs.

Effect of Potential Increase in MCPS Recycling Rate by Material Type

Recyclable Material		Additional Tons Recycled*	Addition to Overall MCPS Recycling Rate
Currently Recycled	Recyclable Paper	1,050	6.4%
	Commingled Containers	360	2.2%
Potentially Recyclable	Milk Cartons	128	0.8%
	Food Trays	64	0.4%
Total		1,602	9.8%

Sources: OLO; MCPS; MSW Consultants, 2007

* based on an assumed 80% capture rate for each material

POTENTIAL COSTS AND SAVINGS FROM INCREASING THE MCPS RECYCLING RATE

Finding #20: MCPS may incur some additional costs to raise its overall recycling rate.

The strategies to increase the MCPS recycling rate could incur additional costs. Some potential costs include:

Costs of increasing the capture of current recyclables: To increase the recycling rate for paper and commingled containers, MCPS may need to increase staff training; fund additional promotional efforts; purchase additional recycling containers; and/or provide incentives for recycling performance.

Costs of converting to recyclable plastic milk bottles: School systems that have converted to plastic milk bottles report experiencing a cost increase of a few cents per sale unit of milk. A two- to four-cent per unit cost increase would raise MCPS' expenditures by an estimated \$200,000 to \$400,000 per year.

Costs of introducing food tray recycling: Implementation of a food tray recycling program would require the execution of a collection contract as well as the purchase of new in-school food tray recycling bins. Discussion with potential food tray recyclers will be necessary to determine the cost of this initiative.

Finding #21: Increasing the MCPS recycling rate could produce reductions in trash collection workload, tip fee payments, and recycling contract costs.

Increasing the MCPS recycling rate would reduce the amount of trash collected from schools resulting in time savings for MCPS trash collection personnel and lower trash disposal costs. In addition, MCPS possibly could realize cost savings by restructuring its recycling collection contract. These potential savings are briefly outlined below.

Trash Collection Workload Reduction: If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce average daily trash collection by about eight tons per day. A reduction of this amount could allow for MCPS to continue to provide schools with every other day trash collection by running only eight (instead of ten) runs per week from each of the four maintenance depots. The reduction of two runs per depot per week would save a combined 40 hours of work time per week. These hours could be assigned to perform truck maintenance and other needed functions. The reduction of truck trips would also lower MCPS fuel and vehicle maintenance costs.

Reduced Tip Fee Costs: MCPS pays a “tip fee” to dispose trash at the County’s Transfer Station. The current tip fee is \$56 per ton. If MCPS achieved an 80% capture rate for recyclable paper and commingled containers, the school system would reduce its annual tip fee payments by about \$80,000. Implementing milk bottle recycling and food tray recycling at an 80% capture rate would yield an additional \$10,000 in annual savings.

Potential Revenue from Sale of Recyclables: Under the terms of the current recycling hauling contract, MCPS pays a fee for collection of paper and commingled containers based on the number of schools served and the frequency of the collection from each school. The current contract costs MCPS about \$600,000 per year.

MCPS intends to re-bid the contract by the end of the current Calendar Year. Some generators of recyclables enter into collection contracts that include sharing of revenues obtained through the sale of recyclable materials. If the new recycling contract includes a revenue sharing provision, MCPS could achieve significant savings by increasing the amount of paper and commingled containers recycled.

CHAPTER IX: RECOMMENDED DISCUSSION ISSUES

The Office of Legislative Oversight recommends that the Council meet with Montgomery County Public Schools (MCPS) representatives to discuss three key issues related to recycling in the schools:

1. Increasing MCPS' overall recycling rate by maximizing the amount of paper and commingled containers recycled in schools.
2. Exploring the feasibility of new recycling opportunities for MCPS.
3. Calculation of potential savings associated with increased recycling.

This chapter outlines these three issues, each of which includes a recommendation for MCPS to report back to the Council no later than November 1, 2008. As a result, OLO recommends the Council approach the discussion on recycling in schools with the expectation of at least two worksessions: an initial worksession to be held this summer; and a follow-up worksession to be held before the end of the calendar year.

Issue #1: Increasing MCPS' overall recycling rate by maximizing the amount of paper and commingled containers recycled in schools.

OLO's study of current school recycling practices evidences that the greatest potential growth in MCPS' overall recycling rates would result from improvements to the paper and commingled container recycling programs already in place.

The basic infrastructure to recycle paper and commingled containers already exists in all MCPS schools. In the 2006-2007 school year, all schools combined to recycle about 57% of recyclable paper and 42% of commingled containers. However, recycling results vary among schools. Eighteen MCPS schools have achieved recycling rates consistent with 80% capture of paper and commingled containers.

By achieving a recycling rate of 80% for paper and commingled containers in all schools, MCPS would divert an additional 1,400 tons from the trash per year and would raise the overall MCPS recycling rate from 27% to 36%. No other readily recyclable material has the potential of increasing the overall MCPS recycling rate by a similar amount.

OLO recommends that the Council request MCPS return by November 1, 2008 with a plan of action for increasing the capture of paper and commingled containers across the school system.

Specifically, the plan of action should address:

- Strategies to identify and develop in-school personnel to take responsibility for the success of the recycling program (recycling “champions”);
- Training and resources needed to equip school administrators, faculty, and building service workers to maximize recycling of paper and commingled containers;
- Development of a recycling “best practices” guide for schools (particularly directed to maximize the capture of recyclable paper);
- Evaluation of the relative effectiveness of different recycling promotion efforts;
- Incentive programs to reward schools that achieve high recycling rates;
- Refinement of recycling and solid waste data to more precisely evaluate school recycling performance; and
- Special assistance to schools with high enrollment or low recycling rates.

Issue #2: Exploring the feasibility of new recycling opportunities for MCPS.

In the course of conducting this study, OLO identified two new recycling opportunities for MCPS that are worth exploring further. OLO recommends the Council ask the Superintendent to report back by November 1, 2008 on the operational and cost feasibility associated with converting to recyclable plastic milk bottles and introducing a program for recycling food trays.

- Converting to recyclable plastic milk bottles: MCPS currently serves school milk in coated paper cartons, which are not readily recyclable. An increasing number of dairies around the country now offer individual serving size milk packaged in recyclable plastic bottles. Implementation of milk bottle recycling could remove about 160 tons from MCPS’ trash. MCPS will soon award a new contract for the purchase of school milk. The Division of Food and Nutrition Services has issued the invitation to bid specifying a preference for milk in recyclable plastic containers.
- Introducing program to recycle polystyrene food trays: MCPS serves school meals on polystyrene trays. MCPS recycled food trays for several years in the late 1980s and early 1990s, but was forced to abandon the program when all local vendors either went out of business or shifted to recycling other materials. Recently, a few school systems in the country have successfully implemented polystyrene tray recycling programs. Implementation of food tray recycling could divert about 80 tons from MCPS’ trash.

To implement food tray recycling, a local vendor must be available to receive the polystyrene trays. At present, no such facility exists in the region. A vendor who accepts trays from the Gwinnett County Public Schools (Georgia) currently is examining the feasibility of opening a facility in the Mid-Atlantic region.

Issue #3: Calculation of potential savings associated with increased recycling.

An increase in an organization's recycling rate means a reduction in the amount of trash that needs to be collected. OLO recommends that the Council ask MCPS to report back by November 1, 2008 with estimates on the potential savings from a reduction in trash generation across all schools. Specific variables for MCPS to consider include:

- The reduction in trash collection workload and associated savings in MCPS fuel and vehicle maintenance costs;
- The reduction in trash disposal (tip fee) payments would decline; and
- Under a new recycling collection contract, MCPS possibly could receive a portion of the revenues realized from the sale of paper and commingled containers collected from schools.

CHAPTER X: AGENCY COMMENTS ON FINAL DRAFT

The Office of Legislative Oversight circulated a final draft of this report to the Chief Operating Officer for Montgomery County Public Schools (MCPS). OLO appreciates the time taken by agency representatives to review the draft report and provide comments. OLO's final report incorporates technical corrections provided by agency staff.

The written comments received from the MCPS Chief Operating Officer are included in their entirety, beginning on the next page.



MONTGOMERY COUNTY PUBLIC SCHOOLS

www.montgomeryschoolsmd.org

MARYLAND

June 4, 2008

Ms. Karen Orlansky, Director
Mr. Aron Trombka, Senior Legislative Analyst
Office of Legislative Oversight
Montgomery County Council
Stella B. Werner Council Office Building
100 Maryland Avenue
Rockville, Maryland 20850

Dear Ms. Orlansky and Mr. Trombka:

The Montgomery County Public Schools (MCPS) comments on the Office of Legislative Oversight Report 2008-11, *Recycling in Montgomery County Public Schools*, are enclosed. These comments focus on the discussion issues identified in the report. The comments present the challenges and improvement strategies relating to each of the discussion issues.

We appreciate your professional and thorough evaluation of the MCPS Recycling Program. Our staff reports that your office was very accommodating to our schedule and operational demands. We appreciate your flexibility, as it contributes to the quality of service that we provide to our community.

Thank you for the opportunity to review the report and provide comments.

Sincerely,

Larry A. Bowers
Chief Operating Officer

LAB:vnb

Enclosure

Copy to:

Dr. Weast
Mr. Gallagher
Mr. Higgins
Mr. Lavorgna
Mrs. Lazor
Ms. Zarate

Office of the Chief Operating Officer

850 Hungerford Drive, Room 149 ♦ Rockville, Maryland 20850 ♦ 301-279-3626

Montgomery County Public Schools
Technical Comments on Office of Legislative Oversight Report 2008-11

Introductory Note

The Montgomery County Public Schools (MCPS) recognizes the importance of environmental stewardship and, in particular, is committed to improving our recycling performance. MCPS supports the county's goal of recycling 50 percent of the waste stream and will continue to work with the Montgomery County government staff to assist in improving recycling performance at all schools.

Since a peak in trash generation in 2001, MCPS has seen a downward trend in the total volume of trash that is generated systemwide, despite an increase in the number of schools and students. In 2001, MCPS had 190 schools and generated more than 15,279 tons of trash. By 2007, MCPS had added 10 additional schools, for a total of 200 schools, and the quantity of trash generated had dropped to 11,367 tons. A reasonable interpretation of this information is that a secondary environmental benefit has occurred. Schools are moving towards a reduction in waste in addition to recycling unwanted materials.

MCPS staff has found this review of the recycling program to be extremely helpful, particularly in the highly-detailed, technical analysis that was performed to quantify and explain variations in recycling performance at different schools. MCPS also appreciates the detailed statistical analysis that determined which factors did not appear to influence recycling performance. Finally, by quantifying the practices associated with relatively high recycling rates, the Office of Legislative Oversight (OLO) has aided MCPS in developing the "recipe" for recycling success. The report will help MCPS staff to focus efforts at individual schools.

We generally agree with the findings published in this report. The following are comments on one finding and the three discussion issues identified in the report.

Page 64—Finding 17: The MCPS schools with the highest recycling rates capture at least 80% of their recyclable paper and commingled containers. Matching this performance in all schools would raise the overall MCPS recycling rate from 27 to 36%.

We agree that there is wide variation in the implementation of recycling programs, and we think this is an appropriate target for the school system. Having a realistic goal will more effectively inspire schools to improve their performance. We appreciate the acknowledgement of the fact that MCPS will be unable to reach a recycling rate of 50 percent due to the distinctive characteristics of the public school system's operations, which result in a high quantities of non-recyclable material in our refuse stream.

Page 67— Issue #1: Increasing MCPS' overall recycling rate by maximizing the amount of paper and commingled containers recycled in schools.

MCPS agrees that the greatest potential for increasing the schools' recycling rate is to improve the existing paper and commingled container recycling programs already in place. MCPS will outline a plan of action by November 1, 2008.

During the past year, MCPS has begun pursuing some of the initiatives discussed in the report, such as the development of a "best practices" guide. In consideration of the projected revenue shortfalls, MCPS deferred some actions until operating funds were available, but continued to seek creative ways to utilize existing resources. MCPS began implementing additional strategies to create synergy between the School Energy Rebate Team (SERT) program and the recycling program, such as synchronizing promotion and training efforts.

Page 68—Issue #2: Exploring the feasibility of new recycling opportunities for MCPS.

MCPS is always looking for opportunities to improve recycling performance and introduce new streams of recyclable materials.

MCPS staff will prepare an analysis on the operational and cost feasibility associated with converting to recyclable plastic milk bottles by November 1, 2008. MCPS believes that switching to recyclable packaging will remove two elements from the waste stream—non recyclable milk cartons and the discarded liquid contents. MCPS believes there will be many positive outcomes if this option is available. First, research studies conducted by the milk industry have documented that students finish all of the milk in the bottle and often consume more milk, thereby increasing the calcium in their diet. Second, if the milk is consumed rather than discarded, the weight of the trash will decline. Third, since there will be less fluid milk in the trash, the condition of the schools' trash rooms and the trash trucks will improve. The lactic acid in the milk causes the concrete floors to disintegrate and the fluid milk is a source of moisture and contamination in the trash trucks.

MCPS had previously contacted the Styrofoam recycling vendor mentioned in this report and in the MCPS waste composition study. At that time, the vendor indicated that MCPS did not appear to have the volume that would sustain opening a Styrofoam recycling facility in this region. However, if a facility becomes available, MCPS sees this as a welcome opportunity to increase our recycling efforts and will prepare an analysis on the operational and cost feasibility associated with recycling Styrofoam trays.

Page 69—Issue #3: Calculation of potential savings associated with increased recycling.

MCPS agrees that cost savings could be realized due to avoided tip fees, reduced fuel costs, and deferred vehicle maintenance costs. As part of reviewing the recycling business processes, MCPS plans to estimate these cost avoidances.

MCPS plans to pursue a revenue-sharing agreement with paper and commingled vendors. To account for timing considerations related to the procurement process, MCPS will publish a new request for recycling collection services proposal by November 1, 2008.

Office of Legislative Oversight Report 2008-11

RECYCLING IN MONTGOMERY COUNTY PUBLIC SCHOOLS

APPENDIX

Appendix	Title	Begins on Circle Number
A	Montgomery County Executive Regulation 15-04AM. "Residential and Commercial Recycling."	1
B	MCPS Regulation ECF-RC	20
C	SERT Action Plan form, 2007-08	23
D	Division of Solid Waste Services' School Recycling Evaluation	26
E	MCPS Solid Waste Audit Executive Summary	27



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

Montgomery County regulation on:

SOLID WASTE AND RECYCLING

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

REGULATION

Issued by: County Executive

Regulation No. 15-04AM

COMCOR 48.00.03, Solid Waste and Recycling, Chapter 48

Authority: Montgomery County Code, 1994, Sections: 48-6, 48-24 and 48-51

Supersedes: Regulation 109-92AM

Council Review: Method (1) under Code Section 2A-15

Register Vol. 21 No. 9

Effective Date: February 8, 2005

Sunset Date: None

Summary: The proposed regulation describes the residential recycling requirements for single-family and multi-family dwellings (including reporting requirements for multi-family property owners), nonresidential recycling and reporting requirements, and recycling requirements for collectors of solid waste and recyclable materials.

Comment deadline: September 30, 2004

Effective date:

Address for comments: Director, Department of Public Works and Transportation
Executive Office Building
Tenth Floor
101 Monroe Street
Rockville, Maryland 20850

Staff contact: Eileen Kao, Recycling Coordinator
240-777-6400



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

Background Information:

Bill 109-92AM, Solid Waste – Recycling, was enacted on March 23, 1992, with an effective date of January 13, 1994. The County Comprehensive Solid Waste Management Plan for the years 1998 - 2007 was adopted by Council Resolution 13-418, adopted August 4, 1998, and was reconsidered, amended, and re-adopted by Council Resolution 13-1418 dated October 6, 1998, respectively. These regulations are to further update the provisions of Bill 109-92AM and implement the Solid Waste Management Plan.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

Section 1. Definitions. Terms defined herein are for purposes of this Article only. The terms used are as defined in Chapter 48 of the Montgomery County Code and as defined in this section:

- (a) **"Acceptable"** means items which conform to prevailing and customary standards of existing recycling markets.
- (b) **"Business"** means any enterprise, individual, corporation, partnership (limited or general), sole proprietorship or other entity or person, including institutions, health care facilities, construction sites, the Federal Government and other government agencies, to the extent authorized by law.
- (c) **"Commingled materials"** mean acceptable items such as aluminum cans and foil products, bi-metal cans, glass bottles and jars, and plastic narrow neck bottles, which are not separated by type, but are mixed together in one container.
- (d) **"Department"** means Montgomery County Department of Public Works and Transportation.
- (e) **"Director"** means Director of the Montgomery County Department of Public Works and Transportation.
- (f) **"Disposal facility"** means the Montgomery County Transfer Station or any other location operated by the County where solid waste is taken for disposal.
- (g) **"Employee"** means any person working on-site 20 or more hours per week directly for the business or for an entity affiliated with the business; and any person working on-site for the business or an entity affiliated with the business as an agent or independent contractor for more than six months in any calendar year.
- (h) **"Generator"** means the owner or occupant of any dwelling unit where solid waste is generated, and the owner or occupant of any other business, entity or institution at, from, or by which solid waste is generated.
- (i) **"Market"** means any business that receives processed or unprocessed source separated or commingled recyclable solid waste and utilizes the material as a finished product or as a raw material for a manufacturing process.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (j) **"Mixed paper"** means acceptable paper items which are not separated by type, but are mingled and collected together. These items include white paper, colored paper, corrugated cardboard, boxboard, newspapers and inserts, magazines, catalogs, telephone directories, paperback books, unwanted mail, and other clean, dry paper.
- (k) **"Recyclables"** means those materials in the solid waste stream which are collected, separated, processed and returned to the economic mainstream in the form of raw materials or product for reuse.
- (l) **"Recycling"** means any process by which materials are diverted from the solid waste stream and are collected, separated, processed and returned to the economic mainstream in the form of raw materials or product for reuse.
- (m) **"Recycling plan"** means a plan describing a program for source reduction and recycling.
- (n) **"Scrap metal"** means acceptable items consisting of metal and/or predominantly metal materials. These items include washers, dryers, refrigerators, air conditioners, dishwashers, sinks, stoves, freezers, furnaces, hot water heaters, trash compactors, iron furniture, doors, cabinets, humidifiers/dehumidifiers, bikes, swing sets, aluminum lawn chairs, shower stalls, and disassembled metal sheds.
- (o) **"Solid waste stream"** means solid waste as defined in Chapter 48-1 of the Montgomery County Code from the point of generation to disposal.
- (p) **"Sorted"** means a category of recyclable materials which are further separated into sub-categories or groupings in preparation for recycling. For example, generators may separate paper by grade or type.
- (q) **"Source separation"** means the process of separating recyclables from the solid waste stream at the point of generation and placing them into containers or arranging them in a manner specified by the County or by a valid collection contract for reuse or recycling.
- (r) **"Unavailable"** means non-existent.
- (s) **"Unit"** means housing unit.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (t) **"Waste reduction /source reduction"** means reducing the amount of waste generated at the source or point of generation.
- (u) **"Yard trim"** means leaves, grass, garden trimmings and brush.

Section 2. Waiver from these Regulations, subject to the requirements of 48-3(c) of the Montgomery County Code

- (a) The Director may grant temporary or permanent waivers from participation in the recycling program to individuals who are physically impaired and who are not reasonably able to undertake the activities required by this regulation.
- (b) The Director may also grant a temporary partial waiver for all generator categories for particular materials which would otherwise have to be recycled where markets for these materials are unavailable.
- (c) Persons or entities for whom compliance with Section 3 subsection (b) and subsection (c) herein would be an unreasonable hardship may apply to the Director for a temporary or permanent waiver in a manner prescribed by the Director.
- (d) For entities subject to recycling plan or report requirements, a request for a waiver must be submitted with the recycling plan and/or annual report. If the plan/report has already been filed, the request must accompany an amended plan/report. If the request for a waiver is denied, the plan and/or annual report must be resubmitted within 30 days from the date of denial, to include the materials for which a waiver was sought unless a plan and/or annual report on file already addresses those materials. Those persons or entities requesting a waiver must specify the materials requested to be waived from recycling requirements, the duration of the requested waiver, reason(s) for the request at the time they submit it, and include any documentation necessary to justify a waiver.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (1) The Director must consider the following criteria in granting a waiver:
 - (A) The unavailability of markets for the material identified;
 - (B) Extreme financial hardship due to significant disparity between the costs of recycling an identified material and the costs of disposal of that material; or
 - (C) The unavailability of an on-site or proximate off-site location to prepare and store materials for recycling.

Section 3. Solid Waste Reduction and Recycling Program

- (a) **Single-family residential recycling program, including dwellings having 6 or fewer dwelling units.**
 - (1) Recycling services areas.
 - (A) The entire County is a recycling service area for the collection of mixed paper; commingled materials; yard trim; Christmas trees; and scrap metals.
 - (B) Recycling service sub areas are designated on a map maintained by the Department and available upon request. All residents provided County recycling service must recycle in accordance with these regulations, Chapter 48 of the Montgomery County Code (1994), as amended, and the schedule for their recycling service sub area maintained and publicized by the Division of Solid Waste Services.
 - (2) Preparation of material for recycling collection.
 - (A) Mixed paper. Mixed paper must be separated from other solid waste and placed in wheeled carts provided by the County, in paper bags, in small cardboard boxes or tied with string strong enough to support the weight of the bundle and prevent dispersion. The total weight of each bag, box or bundle must not exceed 45 gallons in volume and 60 pounds in weight. A County supplied wheeled cart does not have a weight limit and can have up to a 100 gallon capacity. Mixed paper contaminated by garbage or other putrescible material must not be included for recycling.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (B) Commingled materials. All commingled materials must be separated from other solid waste and placed in a County approved container. Lids, tops, and any loose food or liquid must be removed.
- (C) Yard trim. Grass and leaves must be placed in containers or large paper bags labeled "yard trim". Containers or bags must not exceed 45 gallons in volume and 60 pounds by weight. Brush must not exceed 4 inches in diameter and 6 feet in length, and must be placed in labeled containers or paper bags or tied in bundles no greater than 36 inches in diameter. Plastic bags must not be used to contain any yard trim or Christmas trees. Christmas trees must have all ornaments and metal objects removed.
- (3) Collection requirements.
- (A) Location. Materials to be recycled must be placed within 10 feet of the publicly maintained right-of-way closest to the dwelling. Materials must not be placed in a manner that interferes with parking or vehicular and pedestrian traffic.
- (B) Alternate location. Residents for whom placement in accordance with paragraph (A) would be a hardship may apply to the Director for permission to use an alternate location. The Director may set a time limit on any permission granted. Any recycling container used at an approved alternate location must be identified, as provided by the Director, and must be visible from the publicly maintained right-of-way.
- (C) Time limit. Materials prepared for recycling must be set out for collection no earlier than 5:00 p.m. before the designated day of collection, and no later than 7:00 a.m. on the designated day of collection. Recycling containers must be removed from the collection location no later than 5:00 p.m. the day after that designated for collection.
- (D) Litter. Owners and occupants are responsible for keeping the area around recycling containers litter free.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

(b) **Multi-family residential recycling program - Buildings
with 7 or more dwelling units.**

- (1) Applicability. This section is applicable to all generators, property owners, property managers, whether individuals or entities, and common ownership associations, including boards of condominium associations and cooperative housing projects (as those terms are defined in state law) of multi-family dwelling units that have 7 or more units ("multi-family entities"). This section is not applicable to facilities receiving collection as described in (a) or to businesses covered under (c).
- (2) Multi-family entities and residents must recycle. Materials which are required to be recycled are: mixed paper; commingled materials; yard trim; Christmas trees; and scrap metal items. Persons or entities covered by this section are encouraged to recycle any other materials for which there is a viable market.
- (3) Plan and report requirements.
 - (A) Designation of responsible agent. Multi-family entities subject to this section must designate an agent responsible for carrying out the plan and report requirements of this section. In the case of multi-family dwelling units covered by a common ownership association, the association representative, as listed in the Office of Common Ownership Properties, is responsible. In the case of leased units or facilities, the property owner or representative, as listed with the Montgomery County Office of Landlord and Tenant Affairs or as confirmed through other sources, is responsible.
 - (B) Waste reduction and recycling plan.
 1. Who must submit. Multi-family dwellings having 101 or more units must submit a waste reduction and recycling plan demonstrating how the entity will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight, for each facility. Multi-family dwellings having 100 or fewer units must submit a waste reduction and recycling



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

plan demonstrating how the entity will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight, within 60 days from receipt of a written request for a plan from the Department.

2. Contents of plan. The plan must be submitted on forms provided by the Department and must include, at a minimum, description of facility by type; name, address, and telephone number of contact person responsible for on-site recycling program; list of materials to be recycled; name and address of person/collection company providing recycling collection service; sites where materials are delivered; and description of waste reduction activities.

(C) Annual report on waste reduction and recycling activities.

1. Who must submit. All multi-family entities having 101 or more units must prepare and submit to the Department, on or before February 1 of each year, an annual waste reduction and recycling report for each facility covering the previous calendar year. Multi-family entities having 100 or fewer units must prepare and begin submission of initial annual waste reduction and recycling reports within 60 days from receipt of a written request for reports from the Department. From that time forward, each year, all of these entities must prepare and submit to the Department on or before February 1 annual waste reduction and recycling reports covering the previous calendar year.
2. Contents of report. The annual report must be submitted on a form provided by the Department and must include tonnages of materials collected for recycling and for solid waste disposal, and any changes from the approved recycling plan required under Section 3(b)(3)B(2) of this regulation. If recyclable materials are self-hauled to a recycling facility, the multi-family entity must obtain scale house tickets and provide these as documentation of quantity recycled for reporting requirements. Only in the event that scale house tickets are not obtainable, may receipts and/or



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

other proof of quantity recycled be substituted. The annual report must also include a description of the multi-family entity's efforts to educate tenants, residents and/or employees about its recycling program.

3. Review Process. Annual reports will be reviewed, field verified and audited by the Department through on-site evaluation.
- (4) Certification. All reports and plans must be signed by a person authorized to bind the multi-family entity, and must certify that the information is correct to the best of his or her knowledge. Examples of authorized persons include the property owner or responsible agent.
- (5) Verification of information. Multi-family entities must maintain, and make available, upon request, to the Department for inspection and copying during normal business hours, any contracts and invoices for collection and disposition of materials to be recycled for a period covering the most recent five (5) years. Contract prices and other such financial information may be deleted from the materials provided.
- (6) Containers. Containers for all required recyclable materials in adequate sizes and quantities must be placed in each location where trash containers are located, and must be clearly labeled to indicate the appropriate material(s) to be placed inside for recycling. All containers must be located within reasonable and convenient proximity to all dwelling units, and to any offices, clubhouses, recreation facilities, and other uses on-site. In addition, wherever vending machines dispensing products in recyclable packaging are located, recycling containers for those materials must be located in close and convenient proximity.
- (7) Property Owner of Multi-family Properties. Property owners of multi-family entities must make recycling collection service and storage space for recyclable solid waste available to tenants in compliance with these regulations and Section 48-24 of the Montgomery County Code.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

(8) Collectors Servicing Multi-Family Entities.

(A) Collectors must collect and deliver to a recycling facility materials that have been source separated from the solid waste stream, unless the recyclable materials are not acceptable. If a collector determines that the recyclable materials are not acceptable then the collector must inform the generator or responsible agent in writing using a form designated by the County, keep a copy on file, and send a copy to the Department. The collector must indicate the name of the property, name of the responsible agent notified, date, time, address, the nature of the problem and suggested remedy and specify a collector contact name and phone number for additional information.

(B) Collectors must provide a copy of their current Montgomery County Collector's License to each customer at least once annually, and must keep a copy of such notice and the date provided to its customer in their business records. If a copy has not yet been provided and a customer requests one, the collector must provide the customer with a copy of its license within 3 business days.

(9) Contract Services.

(A) A multi-family entity, when contracting for collection service of recyclable materials must use a currently licensed collection company that has a license to collect and transport recyclable solid waste in the County ("Licensed Collector").

(B) A multi-family entity contracting for collection services with a Licensed Collector must maintain for inspection a copy of the Licensed Collector's license. A property manager or responsible agent must produce a copy of the license upon request by the Department within 3 business days.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

(c) **Commercial recycling and waste reduction program –
Generators/Businesses.**

- (1) Business Size. For the purposes of this subsection (c), businesses are classified into the following size categories:
Large businesses. All businesses with 250 or more employees.
Medium-sized businesses. All businesses with 100-249 employees.
Small businesses. Businesses with fewer than 100 employees.
- (2) Applicability. This section applies to all generators and businesses, which must recycle the materials described in Section 3(c)(3) herein. All businesses in Montgomery County must comply with these recycling regulations within 30 days of operating within the County.
- (3) Businesses and employees must recycle. Materials required to be recycled by businesses are: mixed paper or sorted paper; commingled materials (which may be sorted); yard trim; Christmas trees; and scrap metal items. Businesses are encouraged to recycle any other materials for which there is a viable market.
- (4) Verification of information. Businesses must maintain, and make available, upon request, to the Department for inspection and copying during normal business hours, any contracts and invoices for collection and disposition of materials to be recycled for a period covering the most recent five (5) years. Contract prices and other such financial information may be deleted from the materials provided.
- (5) Requirement for a waste reduction and recycling plan.
 - (A) Applicability.
 1. Large and medium-sized businesses. All large and medium-sized businesses must prepare a waste reduction and recycling plan demonstrating how the business will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight.



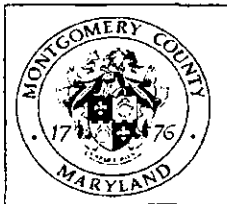
MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

2. Small businesses. Small businesses must prepare a waste reduction and recycling plan demonstrating how the business will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight, within 60 days from receipt of a written request for a plan from the Department.
3. Property owner of multi-tenant facilities. Owners of multi-tenant facilities must file a waste reduction and recycling plan covering facilities in their entirety, and including information for all tenants, demonstrating how the businesses will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight.
4. Multiple Business Locations. Each business required to submit a plan and/or report for multiple locations in the County may submit a single plan and/or report to cover multiple locations, or may submit an individual plan and/or report for each separate location demonstrating how the business will recycle or reduce the amount of solid waste going to disposal facilities with the goal of reducing solid waste for disposal by at least 50% annually, by volume or weight, in compliance with these regulations. Any plan and/or report covering multiple locations must list each property address subject to it, and each location covered by the plan and/or report must maintain a copy of the plan and/or report on the premise.

(B) Plan updates. A business must update its plan if there are changes to the waste reduction and recycling activities of the business or if required as a result of revisions to these regulations.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (C) Contents of plan. The waste reduction and recycling plan must be on forms provided by the Department and must include the following:
1. A description of the business, including;
 - a. Name and address of the property owner and the reporting business.
 - b. Names of all entities affiliated with the business, including any parent and subsidiary business.
 - c. Number of full-time and part-time employees.
 - d. Number of square feet occupied by the business.
 - e. The activities conducted by the business.
 2. A description of the business' current solid waste generation, including:
 - a. Estimated tonnage of all solid waste produced.
 - b. Identification of recyclable solid waste defined in subsection (c)(3) above.
 3. A description of the business' waste reduction and recycling methods.
 4. Name(s) of the person(s) responsible for coordinating recycling and waste reduction activities, preparing the annual report, and for responding to the Department on actions concerning implementation and enforcement of these regulations.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

5. Name and phone number of the licensed collector responsible for collecting the materials to be recycled and sites where materials are delivered.
- (6) Requirement for an annual report on waste reduction and recycling activities.
 - (A) Applicability.
 1. Large businesses. Each year all large-sized businesses must prepare and submit to the Department on or before February 1 annual waste reduction and recycling reports covering the previous calendar year.
 2. Medium-sized businesses. Each year, all medium-sized businesses must prepare and submit to the Department on or before March 1 annual waste reduction and recycling reports covering the previous calendar year.
 3. Small businesses. Small-sized businesses must prepare and begin submission of initial annual waste reduction and recycling reports within 60 days from receipt of a written request for reports from the Department. From that time forward, each year, all of these small businesses must prepare and submit to the Department on or before March 1 annual waste reduction and recycling reports covering the previous calendar year.
 4. Property owner of multi-tenant facilities. Owners of multi-tenant facilities must file annual waste reduction and recycling reports covering facilities in their entirety, and including information for all tenants. Each year, owners must prepare and submit to the Department on or before March 1 annual waste reduction and recycling reports covering the previous calendar year.

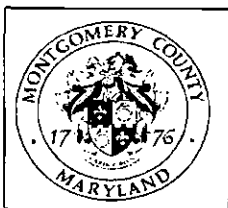


MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

- (B) Review Process. Annual reports will be reviewed, field verified and audited by the Department through on-site evaluation.
- (C) Contents of the report. The annual report must include the following information on waste reduction and recycling activities conducted between January 1 and December 31 of the previous calendar year:
1. Any change in the description of the business as submitted in the waste reduction and recycling plan or most recent annual report, including:
 - a. The purpose of, and activities conducted by, the business.
 - b. The number of full-time and part-time employees associated with the business.
 - c. The number of square feet occupied by the business.
 2. Identification of the total annual tonnage of solid waste generated and the annual tonnage of each type of material being reduced or recycled.
 3. Name and phone number of the licensed collector responsible for collecting the materials to be recycled and sites where materials are delivered.
 4. If recyclable materials are self-hauled to a recycling facility, the business must obtain scale house tickets and provide these as documentation of quantity recycled for reporting requirements. Only in the event that scale house tickets are not obtainable, may receipts and/or other proof of quantity recycled be substituted.
 5. A description of the progress in waste reduction and reuse efforts undertaken by the business.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

6. A description of the property management's or business' efforts to educate tenants and/or employees about its recycling program.

(D) Certification. All reports and plans must be signed by a person authorized to bind the business, and must certify that the information is correct to the best of his/her knowledge. Examples of authorized persons include a corporate officer (President, Vice-President, Chief Administrative Officer, Chief Operating Officer or their designee) or owner of the business.

(7) Containers. The owner or operator of each business must place containers for all required recyclable materials in adequate sizes and quantities in each location where trash containers are located, and must clearly label each container to indicate the appropriate material(s) to be placed inside for recycling. All containers must be located within reasonable and convenient proximity to all buildings and other uses on-site. In addition, any business that sells or provides food or beverages in recyclable containers for on-site consumption must provide an adequate size and number of recycling containers for use by consumers, and wherever vending machines dispensing products in recyclable packaging are located, recycling containers for those materials must be located in close and convenient proximity.

(8) Property owner of commercial properties. Property owners must make recycling collection service and storage space for recyclable solid waste available to tenants in compliance with these regulations and Section 48-24 of the Montgomery County Code.

(9) Collectors servicing commercial properties.

(A) Collectors must collect and deliver to a recycling facility materials that have been source separated from the solid waste stream, unless the recyclable materials are not acceptable. If a collector determines that the recyclable materials are not acceptable then the collector must inform the generator or responsible agent in writing using a form designated by the County, keep a copy on file, and send a copy to the Department. The collector must indicate the name of the business, name of the responsible agent notified, date, time, address, the nature of the problem and suggested remedy and specify a collector contact name and phone number for additional information.



MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive • 101 Monroe Street • Rockville, Maryland 20850

Subject Residential and Commercial Recycling	Number 15-04AM
Originating Department DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	Effective Date February 8, 2005

(B) Collectors must provide a copy of its current Montgomery County Collector's License to each customer at least once annually, and must keep a copy of such notice and the date provided in their business records. If a copy has not yet been provided, and a customer requests one the collector must provide the customer with a copy of its license within 3 business days.

(10) Contract Services. Businesses that contract for recycling collection service are required to use a County-licensed collection company.

(A) A business, regardless of employee size or type, when contracting for collection service of recyclable materials must use a collection company that has a license to collect and transport recyclable solid waste in the County ("Licensed Collector").

(B) A business contracting for collection services with a Licensed Collector must maintain for inspection a copy of the Licensed Collector's license. A property manager or responsible agent must produce a copy of the license upon request by the Department within 3 business days.

Section 4. Administration

(a) Responsibilities of the Department.

(1) Forms. The Department must provide any forms, as appropriate, that assist multi-family dwellings with 7 or more units and businesses in meeting the requirements of these regulations.

(2) Confidentiality. Subject to applicable law, the Department must maintain the confidentiality of any information required to be provided in these regulations that identifies markets or customers. The Department must not, unless required by law to do so, disclose this information to third parties other than in nonspecific summary form in general recycling and solid waste analyses. This requirement does not prohibit the Department from using this information in preparing a summary analysis of waste reduction and recycling activities in the County.



MONTGOMERY COUNTY EXECUTIVE REGULATION

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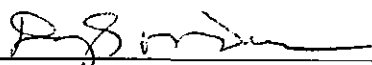
Subject Residential and Commercial Recycling	Number 15-04AM
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Section 5. Enforcement


These regulations may be enforced in accordance with Montgomery County Code 1994, as amended, Section 48-49.

Section 6. Construction

This regulation must be construed liberally to permit the Department to effectuate the purposes of Article V (recycling) of Chapter 48 of the Montgomery County Code (1994), as amended, and the policies of the County's Comprehensive Solid Waste Management Plan.



Douglas M. Duncan
County Executive

APPROVED AS TO FORM AND LEGALITY
OFFICE OF COUNTY ATTORNEY
BY 
DATE 2/2/05

REGULATION

MONTGOMERY COUNTY PUBLIC SCHOOLS

Related Entries:

Responsible Office: Chief Operating Officer
Facilities Management

Recycling

I. PURPOSE

To set forth the process and guidelines for Montgomery County Public Schools (MCPS) staff, students, and other users of school facilities for recycling in accordance with Montgomery County Government regulation

II. DEFINITION

- A. *Recycling* is any process by which materials are diverted from a disposal facility and are collected, separated, processed, and returned to the economic mainstream in the form of raw materials or product for reuse.
- B. A *recycling plan* is a plan describing a program for solid waste reduction and recycling.
- C. An *MCPS Site* is defined as any school or facility, including grounds owned or occupied by MCPS.
- D. The *facility administrator* is the principal of a school or the administrator responsible for facilities other than schools.
- E. The *building recycling coordinator* is the individual designated by the facility administrator to coordinate the facility recycling program.
- F. The *recycling material specialist* is the individual assigned to the Division of Maintenance to coordinate material pick up and assist facilities with recycling plan implementation.

III. PROCEDURES

All public facilities are required by the Montgomery County Government to recycle 50 percent of all solid waste material generated.

- A. The director of the Department of Facilities Management is responsible for ensuring that the procedures outlined below are properly implemented.
1. Facility administrators for MCPS facilities will designate a building recycling coordinator to complete the following tasks:
 - a) Establish a comprehensive recycling plan for the facility. The facility administrator will endorse the recycling plan and submit a copy to the recycling material specialist prior to September 30 of each school year.
 - b) Form a team of staff, students, and community members to increase awareness of the need to recycle, build school/community support for the program, and provide oversight for compliance with the recycling plan.
 2. Facility administrators will submit the name of the building recycling coordinator and a designated back-up to the recycling material specialist prior to September 15 of each school year.
 3. The recycling material specialist will be responsible for assisting the building recycling coordinator and school-based staff in the implementation and maintenance of recycling programs for MCPS facilities.
 4. The following items without food contamination will be recycled:
 - a) Paper
 - Office/classroom paper
 - Mixed paper
 - Magazines
 - Printer paper
 - Computer paper
 - Fax paper
 - Corrugated cardboard
 - Phone books
 - Newspaper
 - b) Other
 - Aluminum cans
 - Bi-metal (sheet and tin) cans

Glass bottles and jars
Plastic containers (must have a neck on them)
Yard trim (grass, leaves, and brush)

5. The Montgomery County Division of Solid Waste Services (MCDSWS) will assist in the development of recycling plans upon request.
6. MCDSWS will conduct periodic on-site evaluations to monitor the effectiveness of recycling programs and provide assistance for improving recycling efforts. Evaluation results and recommendations will be provided to the school and director, Department of Facilities Management.

Regulation History: New Regulation March 10, 2000.



Department of Facilities Management
2096 Gaither Road, Suite 200, Rockville, MD 20850

www.greenschoolsfocus.org

Due: September 28, 2007 by 5:00PM

Please return fully completed form via PONY to:
Department of Facilities Management, 2096 Gaither Road,
Suite 200, Attn: Green School Focus or fax to (240-314-1037)
Note: Keep a copy for your records.

2007-2008 SERT ACTION PLAN

"SERT = Conservation + Recycling"

School/Facility: _____

Principal/Assistant Principal completing form (please print): _____

Principal/Assistant Principal signature (REQUIRED): _____

Facility#: _____ BSM: _____

Administrative Secretary (name & e-mail): _____

of portable classrooms on site (*): _____ # of students (*): _____ # of staff (*): _____

* Note: Leave blank if information is not available.

Contact Information

Team Captains should be teachers or administrators. We strongly encourage having students, additional staff, and building service employees as team members.

Energy Conservation Team (print or type)

Conservation Team Captain:	e-mail:
Team Members	e-mail:
	e-mail:
	e-mail:
	e-mail:

Recycling Team (print or type)

Recycling Team Captain:	Title:
Team Members	Title:
	Title:
	Title:
	Title:

SERT Awards:

- \$500 per quarter in energy savings to top 30 schools
- \$500 per quarter in Good Behavior Awards to schools that meet all energy conservation expectations, as listed

Green Schools Awards:

- Up to \$5,000 per year in energy performance awards to Green Schools (middle and high schools only)



SERT and Green Schools

Energy Conservation Expectations:

Per MCPS policy, the following minimum measures are required to contain energy costs in the schools:

- Engage faculty and recruit students as active participants.
- Shut down equipment before long weekends and school breaks according to "Shutdown Checklist."
- Develop awareness campaigns that take place over the course of the school year and impact all staff and students.
- Turn off lights in all areas, computers and printers when not in use.
- Remove space heaters and personal refrigerators.
- Use blinds to allow natural light into the classroom.
- Vending machines (with minimal nutritional value) must be turned off from midnight to the end of the school day.
- Schedule community groups in as few heating/cooling zones as possible.
- Check all thermostats monthly for correct settings: 70°F for heating, 76°F for cooling.
- Maintain clean air filters for best efficiency.
- Maintain irrigation control plan for athletic fields.
- Restrict exterior water use to authorized MCPS grounds maintenance only.
- Keep classroom blower vents clear.
- All outside doors and windows should be kept closed when heating or cooling is on.

Additional Energy Conservation Opportunities:

The following additional measures have high impact on your energy costs while maintaining or improving learning. With an active program, your school can earn significant quarterly awards.

- ☐ Sponsor a student conservation Club and/or Patrol.
- ☐ Conduct a building energy audit.
- ☐ Provide energy conservation tips and reminders in newsletters and during morning and afternoon announcements.
- ☐ Consolidate personal appliances.
- ☐ De-lamp where lighting levels are too high.
- ☐ Use light switches to keep bank of lights off near windows.
- ☐ Retrofit with 25-watt T-8 lamps.
- ☐ Instead of using overhead lights, use task lamps in offices, at teacher desks, and in computer labs.
- ☐ Turn off main copiers and other equipment at a scheduled time daily.
- ☐ Check Energy Management Schedule for accuracy especially over winter and spring breaks.
- ☐ Check for air leaks around doors and windows. File a work order for repairs.
- ☐ Use emergency lighting in hallways after regular school hours.

Want help with any of the above suggestions? **Check here to have your SERT Facilitator contact you** _____





MCPS Recycling

Recycling Goals: Percentage (%) achieved last year: _____ FY08 Projection: _____

Please visit www.mcps.k12.md.us/departments/recycling to obtain your percentage.

Recycling Program Expectations (as mandated by Montgomery County Executive Regulation 15-04 AM):

- Label each recycling container to indicate contents.
- Place appropriate recycling container (paper and/or can/bottle) near each trash container.
- Place a paper recycling container next to each trash can in classrooms and offices.
- Place a paper recycling container near copiers and printers.
- Place a can/bottle recycling container near each vending machine that dispenses products in recyclable packaging.
- Place large recycling containers in the kitchen and cafeteria areas to recycle cans/bottles.
- Empty recycling containers on a regular schedule.

Recycling Success Opportunities (Please check each item you will implement):

- ☐ Flatten all cardboard boxes to save space in the cardboard recycling dumpster.
- ☐ Use innovative communication techniques, including posters, to ensure containers are used as intended.
- ☐ Use container tops on recycling bins to restrict the types of materials entering containers if recyclable materials are being contaminated.
- ☐ Establish Recycling Club and/or Patrol Team to monitor recycling containers.
- ☐ Have poster contests and collection competitions.
- ☐ Update students and staff on the progress of the recycling program in order to involve them in the program and to demonstrate their contribution to improving the environment.
- ☐ Educate and re-educate about your recycling program using the ☐ school newspaper, ☐ announcements, ☐ posters, ☐ webpage, ☐ e-mail, ☐ school handbook, and ☐ student orientation.
- ☐ If specific items are collected at the school for fundraising, submit copies of receipts to get credit for recycling.
- ☐ Recycle specialty items such as ☐ computers, ☐ monitors, ☐ televisions, ☐ textbooks, ☐ furniture, ☐ ink jet cartridges through the Department of Materials Management.

Recyclable Material Pickup Procedures:

Our school's pickup day(s) for **cans and bottles** is/are _____ [Fill in day(s) of week. If unsure of pickup days, see website.] Roll carts (toters) will be at the designated pickup area outside of the building by 7:00 AM. Roll carts will be placed at ground level or on a dock that is accessible to the recycling collection truck.

Our pickup day(s) for cardboard and paper is/are _____. The dumpster should not be blocked by vehicles or snow.

If materials other than paper and cardboard are placed in the dumpster, the whole load cannot be recycled and must be disposed of as trash. To avoid contamination, dumpsters must be locked when not in use by locking the gravity bar located on the top of the dumpster and the sliding side doors.

Program materials (labels, posters, locks) and assistance are available by contacting the MCPS Recycling Office: 301-840-4536 or e-mail Randy_Weddle@mcpsmd.org. Additional resources can be found on the website (<http://www.mcps.k12.md.us/departments/recycling/>).

Check here if you would like a program review by our staff. _____





DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
DIVISION OF SOLID WASTE SERVICES
101 MONROE STREET, 6TH FLOOR
ROCKVILLE, MD. 20850
(240) 777-6400

☐ Check if Re-Inspection

School: _____
Cluster: _____
Recycling Coord Name: _____
Principal Name: _____
DWS Staff Name: _____
Date: _____

SCHOOL RECYCLING EVALUATION

FOCUS ON PRESENCE OF BASIC INFRASTRUCTURE

COLLECTION:

- ☐ Posters at each collection site
☐ All containers labeled

(0-Poor or None; 1-Adequate; 2-Good)

CONVENIENCE:

- ☐ Location of containers
☐ Sufficient container capacity

(0-Poor or None; 2-Adequate; 4-Good)

PARTICIPATION:

- ☐ Commingled materials
☐ Mixed paper

(0-Low; 2-Moderate; 4-High)

CONTAMINATION:

- ☐ Commingled materials
☐ Mixed paper

(0-High; 2-Moderate; 4-Low)

RECYCLABLES IN TRASH:

- ☐ Amount of recyclable materials in trash containers

(0-High Volume; 2-Moderate Volume;
4-Low Volume)

MANAGEMENT OR STAFF PARTICIPATION:

- ☐ Awareness

(0-Low; 1-Moderate; 2-High)

- ☐ # Of Coordinators: _____

(0- None; 1- One; 2- Two; 3- Committee)

PROGRAM IN PLACE:

- ☐ Recycling Plan

(0-No Plan Submitted to MCPS; 1-Written Plan)

- ☐ Student Participation

(0-None; 1-Minimal; 2-High)

OTHER:

- ☐ Yard Waste
(0-No; 1-Yes)

INSPECTION RATING TABLE:

A = 37-41 B = 33-36 C = 29-32 D = 25-28 F = <24

TOTAL POINTS:

OVERALL RATING:

PROPOSED RE-INSPECTION DATE: _____

This evaluation focuses on the presence of basic recycling program infrastructure, and in no way assesses recycling rate, recycling capture, recycling set out and/or participation rate calculations.

MSWCONSULTANTS



029446

IN FILE

MONTGOMERY COUNTY PUBLIC SCHOOLS

FOUR SEASON WASTE CHARACTERIZATION STUDY

Final Report

January 2007



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MID ATLANTIC SOLID WASTE CONSULTANTS

625 Sawyer Road, New Market, MD 21774 301/607-6428
842 Spring Island Way, Orlando, FL 32828 407/380-8954

www.mswconsultants.us

EXECUTIVE SUMMARY

INTRODUCTION

Montgomery County Public Schools (MCPS), with 194 schools and 139,000 students under management, is required by County Executive Regulation 15-04AM to achieve a 50 percent goal for waste reduction and recycling. According to MCPS's 2003 Waste Reduction and Recycling Report, the school system most recently achieved a 28 percent recycling rate. To better quantify the recyclable materials remaining in the disposed waste stream, and to assess contamination of such materials, MCPS developed Waste Audit Plan (WAP) and subsequently retained MSW Consultants, LLC, to conduct a four-season waste characterization study of disposed wastes from elementary, middle and high schools within the MCPS system. The field data collection for this study was performed beginning in December 2005 and concluded in August 2006. This document summarizes the methodology, findings, and recommendations that resulted from the four season sampling and sorting of disposed wastes from the Public Schools.

STUDY OBJECTIVES

The objectives to this study were several:

- ◆ Inventory and characterize the solid waste stream from a representative number of schools within MCPS;
- ◆ Determine the recyclable fraction of disposed wastes using a statistically defensible approach;
- ◆ Capture the impact of seasonal variations in waste generation and composition that may occur across a twelve-month time period;
- ◆ Identify differences in the composition of disposed wastes among elementary, middle, and high schools so that custom-tailored recycling programs can be developed; and
- ◆ Provide data needed to meet annual reporting requirements of the Montgomery County Division of Solid Waste Services.

METHODOLOGY

The sampling and sorting of disposed wastes performed for this project conformed with industry-standard protocols for statistically defensible estimation of the composition of a disposed waste stream. Full details about the sampling of school wastes, physical sorting, and weighing of the samples, and analysis of the data are contained in Section II of this report.

EXECUTIVE SUMMARY

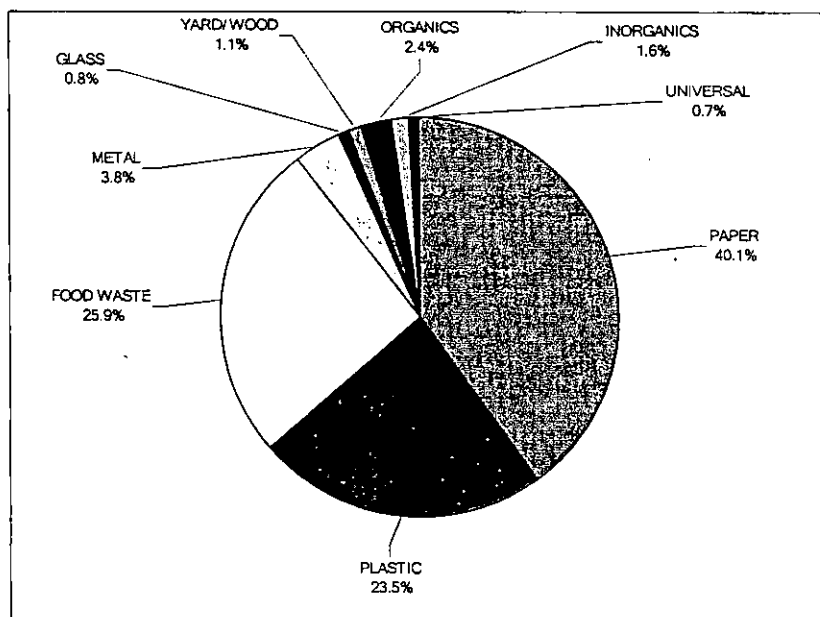
RESULTS

Results are presented in the Executive Summary for all schools in the aggregate. Detailed results for elementary, middle and high schools can be found in Section III. Note that the results do not attempt to adjust for cross-contamination of materials that occurs during collection and transport.¹ A full description of the types of contamination that occur can also be found in Section III.

AGGREGATE RESULTS, ALL SCHOOLS

Figure ES-1 presents a graphical breakdown of the major material categories in the Public Schools' disposed waste stream. Not surprisingly, Paper makes up the largest fraction, followed by Food Waste and Plastics.

Figure ES-1 MCPS Aggregate Waste Composition

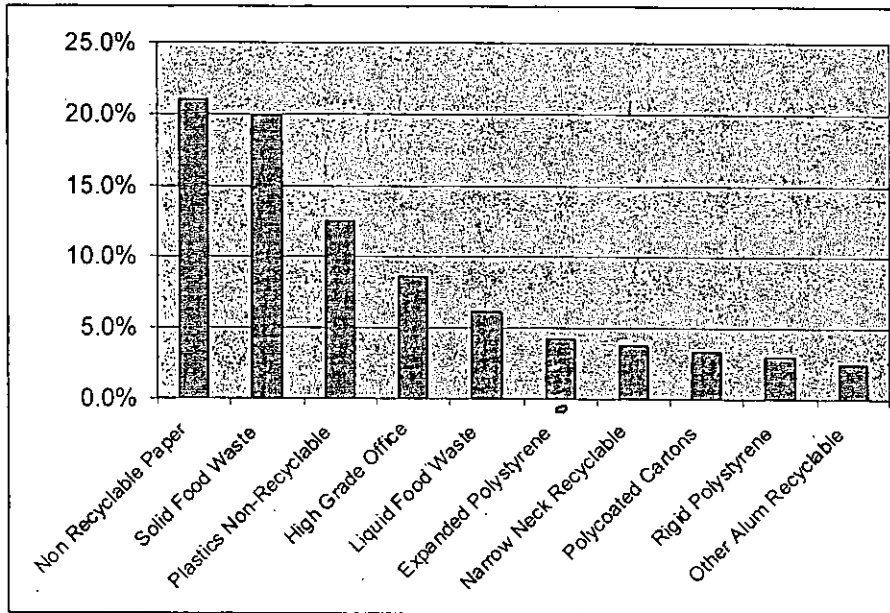


¹ For example, liquid food wastes that are absorbed by otherwise dry paper may artificially increase the weight of the disposed paper.

EXECUTIVE SUMMARY

Figure ES-2 shows the ten most prevalent individual material categories found in the MCPS waste stream. Several of the most prevalent disposed wastes are non-recyclable materials, and therefore do not offer significant potential for diversion. However, High-Grade Office Paper and Narrow Neck Recyclable plastic bottles are both targeted recyclables within Montgomery County. Further, Solid and Liquid Food Wastes present opportunities for further recycling, as do Polystyrene. These opportunities will be discussed in Section IV of the report.

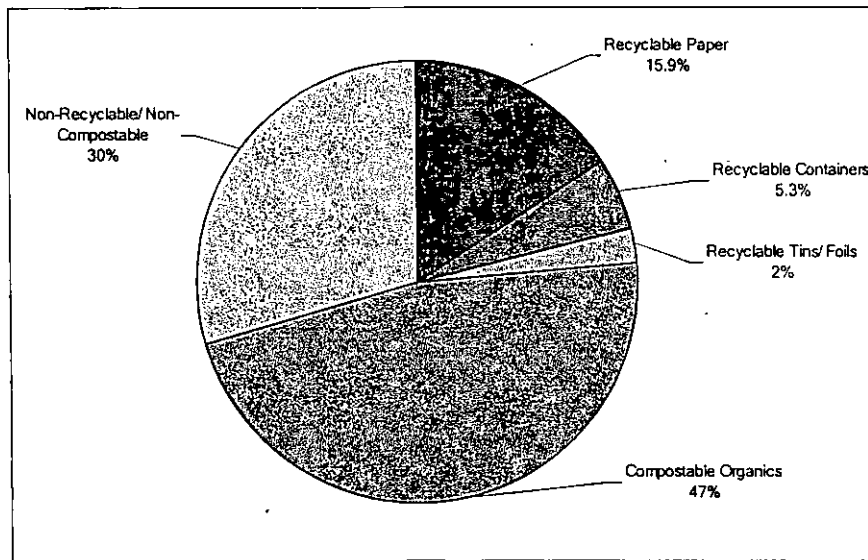
Figure ES-2 Ten Most Prevalent Material Categories, All Schools Aggregate



EXECUTIVE SUMMARY

Figure ES-3 shows the breakdown between recyclable materials (as targeted in Montgomery County code) and non-recyclable materials. Additionally, this pie chart shows the fraction of the waste stream that is made up of compostable organics, which include solid and liquid food waste and low grade non-recyclable paper. System-wide, this study found that over 23 percent of disposed wastes from MCPS could potentially be recycled, and almost half of the waste stream (47 percent) could be composted in a commercial composting program (unadjusted for source contamination of recyclable material).

Figure ES-3 Recyclable, Compostable, and Non-Recyclable, All Schools Aggregate



Although not shown in the Figure above, in absolute terms over 3,137 tons of material could have been recycled and another 6,231 tons could have been composted (unadjusted for source contamination). Aggregate waste composition data for all schools in detailed tabular format, including statistical measures of standard deviation and 95 percent confidence intervals as well as weight data, is contained in Exhibit 2.

COMPARISON OF SCHOOLS

The body of the report contains parallel results as those shown above for elementary, middle, and high schools, and it is left to the reader to review these results in the body of the report. An analysis of the results by school type identifies differences observed between elementary, middle, and high school disposed wastes.

A comparison of the composition of disposed wastes across the three school levels found:

- ◆ Paper as a fraction of total waste increases significantly as one progresses from elementary through high school;
- ◆ Conversely, Food Waste decreases from elementary to high schools;

EXECUTIVE SUMMARY

- ◆ High schools discard the largest fraction of glass;
- ◆ Plastics, Yard Waste, Organics, Inorganics, and Universal Wastes do not appear to vary significantly by type of school.

Similarly, the fraction and type of recyclables being disposed varies by school type. Select findings include:

- ◆ High schools represent the greatest potential to increase recycling, as they were found to dispose of the highest fraction of both recyclable paper and recyclable containers; and
- ◆ Elementary schools appear to have an opportunity to recycle aluminum tins and foil, presumably from cafeteria operations.

The differences above suggest that recycling and diversion programs should be developed that are specific to each type of school, and that there may not be a one-size-fits-all approach.

CONCLUSIONS AND RECOMMENDATIONS

The Public Schools currently have a recycling program in place, and with a 28 percent recycling rate, are recycling a significant fraction of the overall waste stream. This program was reported to have recycled just over 5,000 tons of paper, commingled containers, scrap metals, yard waste, and other materials during the 2005-06 school year.

Table ES-1 illustrates the material-specific recycling rates that are currently being achieved by the Public Schools, based on the results of the waste composition study. As shown, although the overall recycling rate within the schools is roughly 28 percent, the material-specific rate varies widely, with the majority of yard waste being recycled, roughly half of the papers and scrap metals, and 32 percent of the commingled containers.

Table ES-1 MCPS Recycling Rates (9/05 through 8/06)

Material	Tons Disposed [1]	Tons Recycled [2]	Recycling Rate
Recyclable Paper	2,108	2,987	58.6%
Commingled Containers	706	333	32.0%
Scrap Metals	377	381	50.3%
Yard Waste	107	641	85.7%
Other Recyclables (unspecified)	0	740	100.0%
Other Wastes	9,993	0	0.0%
Total	13,292	5,082	27.7%

[1] The tons disposed by material type were calculated based on applying the results of the waste composition study to the annual quantity of disposed waste.

[2] Reported by MCPS.

EXECUTIVE SUMMARY

MSW Consultants makes the following recommendations for consideration by MCPS as they seek to further improve recycling within the Public Schools:

Disseminate Results to Individual Schools: The results of this study from individual schools should be shared with the appropriate school administration. Specific behaviors that can be identified at individual schools, such as including newspapers in the recycling program, should be addressed where appropriate.

Conduct Waste Generation and Process Audits: Waste process audits seek to connect waste generation to business processes so that specific recycling and diversion opportunities can be identified. In a such an audit, which should not be confused with the Recycling Evaluation compliance audit that is conducted by the Montgomery County Division of Solid Waste Services, the host facility is observed during business hours to identify waste and recycling generation points, material handling responsibilities within the building, recycling and educational signage, copies of employee and/or student training that is provided, and other factors that impact recycling. MCPS should conduct waste process audits of at least one elementary school, one middle school, and one high school, as well as the depots that support the Public Schools, to validate the findings of the waste composition study and to better determine the feasibility of many of the remaining recommendations below.

Food Waste Diversion/Composting: Montgomery County already operates a composting facility that accepts green wastes from across the county. MCPS generates a critical mass of food wastes – over 3,400 tons per year (\$175,000 avoided landfill disposal cost) – such that the separation and composting of this material is theoretically feasible within the County's composting program. There appear to be opportunities to implement food waste composting, although many challenges would need to be overcome. Mid- to long-term, the County may wish to (a) investigate the conversion of food service products from polystyrene foam to composite, biodegradable products that have become available in the market; (b) Investigate polystyrene recycling with a company that has found a feasible business plan to collect and recycling this resin; and (c) at elementary schools, investigate a mechanical device to "de-liquefy" cafeteria wastes, which could reduce waste generation from elementary schools by more than five percent.

Employee and Student Training and Education: In parallel with any of the recommendations above that end up being pursued, the training provided to staff and the educational materials provided to students to encourage recycling should be revisited to assure that the appropriate message is being communicated. If recycling is to be maintained and improved, a targeted campaign should be launched in support of this effort.